

City of Santa Fe, New Mexico

Attachment B

Applicant Submittals

**4. Traffic Study, Traffic Report Addendum,
Drainage Analysis**

Tierra Contenta Phase 3A

Traffic Impact Analysis

November 1, 2020

for

TIERRA CONTENTA CORPORATION



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Tierra Contenta Phase 3A Traffic Impact Analysis

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Tierra Contenta Phase 3A Traffic Impact Analysis

EXECUTIVE SUMMARY

The subject of this traffic study is the area within the boundaries of a proposed amended master plan for Phase 3A of Tierra Contenta, a PUD within the City of Santa Fe located on the south side of the first two phases of the Tierra Contenta PUD. This report addresses the impact of the proposed revised land use plan for Tierra Contenta Phase 3A on the surrounding City of Santa Fe roadway system.

A buildout year of 2030 and a horizon year of 2040 were used in the analysis. Based upon the results of this traffic study, the required improvements within the studied area are the following:

- Stop Controlled Intersection of West Paseo del Sol and Jaguar Drive
 - 1) In the build out year 2030 (Phase 2), no improvements are needed
 - 2) In the horizon year 2040, a right turn lane for Jaguar Drive eastbound
- Signalized Intersection of East Paseo del Sol and Jaguar Drive
No improvements are required for Year 2030 and Year 2040
- Roundabout Intersection of Paseo del Sol and Herrera Drive
 - 3) In the build out year 2030, no improvements are required.
 - 4) In the horizon year 2040, a dedicated EB through lane could be required.
- Internal Phase 3A Intersection
Both major internal road intersections will require four way stop controlled for both design year 2030 and horizon year 2040.

Tierra Contenta Phase 3A Traffic Impact Analysis

I. INTRODUCTION

A. Project Location and Description

As described in the draft amendment to the master plan for Phase 3A of Tierra Contenta, the study area consists of 16 large tracts which the owner, the nonprofit Tierra Contenta Corporation, intends to sell to developers and the Santa Fe Public School District for residential, commercial, parkland, and school uses. The assumed time frame for development by these other parties will be 2021 to 2030. The study area comprises approximately 223 acres of which approximately 132 acres will be developed.

Figure 1 is a vicinity map describing the location of this property. Figure 2 describes the site development plans and parcel development.

B. Purpose

The purpose of this Traffic Impact Analysis (TIA) is to evaluate the impact of this residential development on the City of Santa Fe roadway system. This report is to determine the location and required improvements for three existing intersections and two new intersections within the Phase 3A Tierra Contenta development. The location of the existing intersections are both the east and west intersections of Paseo del Sol and Jaguar Drive and the intersection of Paseo del Sol and Herrera Drive.

C. Methodology

This TIA describes existing roadway conditions, present traffic volumes with peaks, future traffic volumes and the impacts of this additional traffic. Impacts to the selected intersection are evaluated on the basis of the time frame for the build-out of the development and the traffic volume for the project design year. Traffic Counts were collected by Walker Engineering. A level of service analysis (LOS) is conducted for the design year using Synchro 10 software. The degree of impacts is evaluated based on the LOS for the intersection. Recommendations for the mitigation of impacts, if they occur, are included in the final section of the report.

Tierra Contenta Phase 3A Traffic Impact Analysis

II PROPOSED DEVELOPMENT

A. Land Use per Parcel

As noted before, this development will be a planned unit development. There will be a total of 16 tracts to be sold to private developers and the Santa Fe Public School District. There will be a total 1,134 residential units, 3.4 acres of commercial development and a proposed elementary school. Table 1 below summarizes the anticipated land use.

Table 1: Phase 3A Tierra Contenta Land Use

Parcel Number	Land Use	Type	Number of Units	Area (Acres)
1	School	Elementary		9.4
2	Single Family	Detached	49	
3	Commercial	Mix Use		1.8
4	Commercial	Mix Use		1.6
5	Single Family	Detached	60	
6	Single Family	Detached	62	
7	Single Family	Detached	108	
8	Multifamily	Apartments	304	
9	Single Family	Townhouse	147	
10	Multifamily	Apartments	192	
11	Single Family	Detached	61	
12	Single Family	Detached	10	
13	Single Family	Detached	86	
14	Single Family	Detached	11	
15	Single Family	Detached	10	
16	Single Family	Townhouse	34	

B. Location and Type of Access Points

For this mixed use development, Paseo del Sol will be extended from the western intersection of Jaguar Drive to the eastern intersection of Herrera Drive. For the internal Phase 3A traffic, a loop road will be built that has two intersections with Paseo del Sol. This loop road is labeled as having an eastern and western intersection. Refer to Figure 2 for the roadway layout. Within Phase 3A, Paseo del Sol will be a two lane roadway with bike lanes.

Tierra Contenta Phase 3A

Traffic Impact Analysis

III. EXISTING AND FUTURE ROAD CONDITIONS

A. Existing Conditions

The western intersection of Paseo del Sol and Jaguar Drive is four way stop controlled with left turn lanes. The eastern intersection of Paseo del Sol and Jaguar Drive is traffic light controlled with protected left turn lanes. The intersection of Paseo del Sol and Herrera Drive is a roundabout.

B. Planned Road Improvements

Since this is a new roadway within an undeveloped section of Tierra Contenta, no other planned improvements are anticipated. Though, several developers in this area have plans to build right turn deceleration/acceleration lanes for certain sections of the project.

IV EXISTING TRAFFIC VOLUMES

Traffic counts were taken using a JAMAR DB-100 unit. The counts for the western intersection of Paseo del Sol & Jaguar Drive were taken on February 12, 2020. The counts for the eastern intersection of Paseo del Sol & Jaguar Drive were taken on February 13, 2020. The counts for the intersection of Paseo del Sol & Herrera Drive were taken on February 19, 2020. The counts were taken for the peak AM period of 7am to 9am and the peak PM period of 4pm to 6pm. Refer to Figure 3 for all three counts. The traffic counts are found in Appendix A.

Tierra Contenta Phase 3A

Traffic Impact Analysis

V. SFMPO VISUM Model

A. Modeling Methodology

The traffic volume forecasts for Tierra Contenta were evaluated using the Santa Fe Metropolitan Planning Organization (SFMPO) VISUM travel demand model. This model is primarily a peak hour model, which also includes mode choice and transit assignments. The model was calibrated to a base year of 2015 and was last updated in 2017 and has had minor refinements since that time with additional data from several projects. It has been used for forecasting AM and PM peaks and will compute daily volumes based upon the peak hour forecasts. Previous iterations of the model have been used for evaluation of the NM 599 improvement priority, Avenida del Sur, Las Soleras, Arroyo de los Chamisos Crossing, NE-SE Connectors, the interchange improvements at I-25 and Cerrillos Road, and other important studies in the Santa Fe MPO area.

This travel demand model (TDM) is a representation of the Santa Fe metropolitan area transportation facilities and the travel patterns using these facilities. This computerized transportation model is used to analyze street and intersection congestion and forecast the need for future roadway improvements. The model contains inventories of the existing roadway facilities and of housing, shopping, schools, and employment in the area.

The transportation modeling procedures were developed to produce representative travel flows for the base year of 2020 in the Tierra Contenta area. Model calibration involved examining multiple factors to adjust model parameters producing a strong comparison between observed data and model produced information. Once calibrated, the model can be used to test forecasted changes in growth patterns or changes to the transportation system. This can include changes in number of housing units, employment centers, travel behavior patterns, or roadway improvements. The SFMPO travel demand model includes the entire MPO area. The model development process, including input data and validation parameters, are described in the report “*Santa Fe Travel Demand Model Documentation, 2017 Update, December 20, 2017*” available from the Santa Fe MPO.

Tierra Contenta Phase 3A Traffic Impact Analysis

B. Forecasts

For this project, the model was refined in the Tierra Contenta area based upon the turning movement counts collected for this study. Because of the network detail required to forecast the intersection volumes, the centroid connectors in Tierra Contenta and surrounding traffic analysis zones were refined and tested to better replicate the turning count patterns and to define the connectors for the forecasts. The forecasts for 2030 and 2040 included planned background growth and transportation improvement projects provided by SFMPO staff. The forecasts for 2030 were tested with and without the projected Tierra Contenta growth.

C. Procedure

1. Enter updated AM and PM peak hour traffic counts for the existing conditions.
2. Update the SFMPO VISUM model in this area as needed and validate the model operation with the count data.
3. Enter forecast land use and demographics into the model from the Tierra Contenta plan, including housing, employment, and students.
4. Run the VISUM model and provide forecast turning volumes for the five intersections noted in the analysis. The post-process the intersection volumes were adjusted for model calibration as closely as possible. Turning movements for the SFMPO VISUM are attached in Appendix B.

Tierra Contenta Phase 3A Traffic Impact Analysis

VI. TRAFFIC EVALUATION

A. Level of Service

Synchro 10 software was used to determine the operational level of service (LOS) for the intersections. The LOS is conducted for the design years 2030 and 2040. First, LOS were determined for fully developed conditions for both years. If a LOS with failing conditions were identified, then LOS for undeveloped condition was run to determine what improvements will be required to improve the LOS.

LOS is ranked from A-F, with A being the highest level of service with the least delays and F indicating a break-down in the operation of the intersection. Table 2 summarizes the delays associated with LOS rankings for both an unsignalized intersection and a signalized intersection.

Table 2 LOS Rankings

LOS	Unsignalized Intersection	Signalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Tierra Contenta Phase 3A Traffic Impact Analysis

B. Existing Western Intersection of Jaguar Drive and Paseo del Sol

The western intersection of Jaguar Drive and Paseo del Sol is an unsignalized with stop conditions on all four approaches. The traffic volumes and distributions were taken from Figure 5 for Year 2030 and from Figure 8 for Year 2040. The Synchro 10 results are summarized below on Table 3. The analysis reports are attached in Appendix C.

TABLE 3: Jaguar Drive and Paseo del Sol West LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 5 Year 2030		Figure 8 Year 2040	
Movement	AM	PM	AM	PM
Paseo Del Sol SB	B/13.1	B/13.4	C/15.5	C/17.5
Paseo Del Sol NB	B/13.6	B/13.1	C/17.7	C/17.0
Jaguar Drive EB	B/13.4	C/17.5	C/17.1	E/45.2
Jaguar Drive WB	B/12.2	B/13.3	C/15.1	C/19.3

The LOS E for the year 2040 for eastbound Jaguar Drive is close to failure, an additional analysis was completed to determine what roadway improvements would be necessary to bring the LOS up. The only improvement needed for the four way stop sign would be a dedicated right turn lane for eastbound Jaguar Drive. Table 3A summarizes the results.

TABLE 3A: Jaguar Drive and Paseo del Sol West Right Turn Lane Jaguar Dr Eastbound LOS ANALYSIS/DELAY (Seconds)		
	Year 2040	
Movement	AM	PM
Paseo Del Sol SB	C/17.8	C/19.9
Paseo Del Sol NB	C/20.4	C/19.0
Jaguar Drive EB	B/14.1	C20.1
Jaguar Drive WB	C/17.44	C/23.5

Tierra Contenta Phase 3A Traffic Impact Analysis

C. Existing Eastern Intersection of Jaguar Drive and Paseo del Sol

The eastern intersection of Jaguar Drive and Paseo del Sol is signalized with protected left turns on all four approaches. The traffic volumes and distributions were taken from Figure 5 for Year 2030 and from Figure 8 for Year 2040. The Synchro 10 results are summarized below on Table 4. The analysis reports are attached in Appendix D.

TABLE 4: Jaguar Drive and Paseo del Sol East LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 5 Year 2030		Figure 8 Year 2040	
Movement	AM	PM	AM	PM
Paseo Del Sol NB	C/25.3	B/17.7	C/33.6	C/20.6
Paseo Del Sol SB	C/22.5	B/13.2	C/26.4	B/15.9
Jaguar Drive WB	C/29.0	C/27.1	C/32.3	C/32.6
Jaguar Drive WB	C/20.3	B/18.4	C/21.0	B/18.3

The LOS is acceptable for all approaches for both buildout year 2030 and horizon year 2040. .

Tierra Contenta Phase 3A Traffic Impact Analysis

D. Existing Intersection of Herrera Drive and Paseo del Sol East

The intersection of Herrera Drive and Paseo del Sol is an unsignalized roundabout with three approaches. The traffic volumes and distributions were taken from Figure 5 for Year 2030 and from Figure 8 for Year 2040. The Synchro 10 results are summarized below in Table 5. The analysis reports are attached in Appendix E.

TABLE 5: Herrera Drive and Paseo del Sol East LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 5 Year 2030		Figure 8 Year 2040	
Movement	AM	PM	AM	PM
Herrera Drive EB	C/24.4	A/8.8	E/44.7	B/11.4
Herrera Drive WB	A/6.9	A/9.6	A/6.8	B/10.8
Paseo Del Sol SB	A/9.7	A/9.8	C/11.3	B/12.8

Tierra Contenta Phase 3A Traffic Impact Analysis

E. Western Loop Road and Paseo del Sol

The intersection of Western Loop Road and Paseo del Sol is a new intersection within the proposed Phase 3A development. The intersection was assumed to be a four way stop condition. The traffic volumes and distributions were taken from Figure 6 for Year 2030 and from Figure 9 for Year 2040. The Synchro 10 results are summarized below on Table 6. The analysis reports are attached in Appendix F.

TABLE 6 Western Loop Road and Paseo del Sol FOUR WAY STOP CONDITIONS LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 6 Year 2030		Figure 9 Year 2040	
Movement	AM	PM	AM	PM
Paseo Del Sol EB	A/9.5	B/10.2	B/14.0	B/13.5
Paseo Del Sol WB	A/9.5	B/10.2	B/12.3	B/11.1
South Loop NB	A/8.4	A/9.6	B/13.0	B/10.9
North Loop SB	A/8.7	A/8.7	B/10.7	A/9.4

The LOS is acceptable for all approaches for both buildout year 2030 and horizon year 2040.

Tierra Contenta Phase 3A Traffic Impact Analysis

F. Eastern Loop Road and Paseo del Sol

The intersection of Eastern Loop Road and Paseo del Sol is a new intersection within the proposed Phase 3A development. This intersection was assumed to be a four way stop condition. The traffic volumes and distributions were taken from Figure 6 for Year 2030 and from Figure 9 for Year 2040. The Synchro 10 results are summarized below on Table 7. The analysis report is attached in Appendix G.

TABLE 7 Eastern Loop Road and Paseo del Sol FOUR WAY STOP CONDITIONS LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 6 Year 2030		Figure 9 Year 2040	
Movement	AM	PM	AM	PM
Paseo Del Sol EB	A/18.4	B/10.3	B/14.3	B/11.9
Paseo Del Sol WB	B/12.7	B/14.5	C/15.1	C/17.0
South Loop NB	B/13.3	B/10.2	C/16.8	B/11.3
North Loop SB	B/10.8	A/9.8	B/11.9	B/10.0

The LOS is acceptable for all approaches for both buildout year 2030 and horizon year 2040.

Tierra Contenta Phase 3A Traffic Impact Analysis

VII. SUMMARY AND RECOMMENDATIONS

A. Summary

Tierra Contenta Phase 3A will have minimal impact on the City of Santa Fe road system. The required improvements have been identified and will be implemented as the subdivision is developed.

B. Recommendations

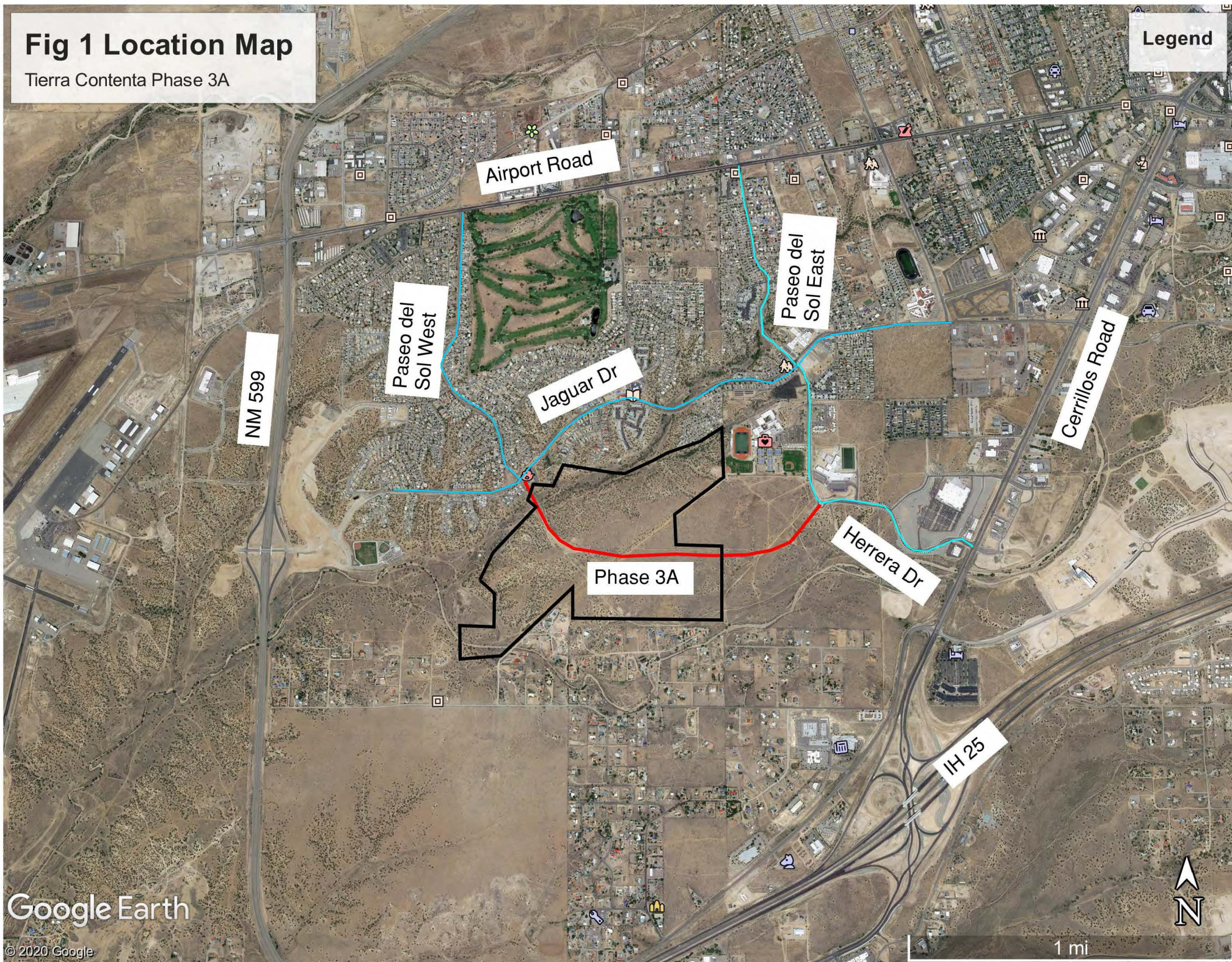
Based on this traffic impact analysis, the following recommended improvements should be made with Tierra Contenta Phase 3A:

- Stop Controlled Intersection of West Paseo del Sol and Jaguar Drive
 - 1) In the build out year 2030, no improvements are needed
 - 2) In the horizon year 2040, a right turn lane for Jaguar Drive eastbound
- Signalized Intersection of East Paseo del Sol and Jaguar Drive
No improvements are required for Year 2030 and Year 2040
- Roundabout Intersection of Paseo del Sol and Herrera Drive
 - 1) In the build out year 2030, no improvements are required.
 - 2) In the horizon year 2040, a dedicated EB though lane could be required.
- Internal Phase 3A Intersections
Both major internal road intersections will require four way stop controlled for both design year 2030 and horizon year 2040

Fig 1 Location Map

Tierra Contenta Phase 3A

Legend



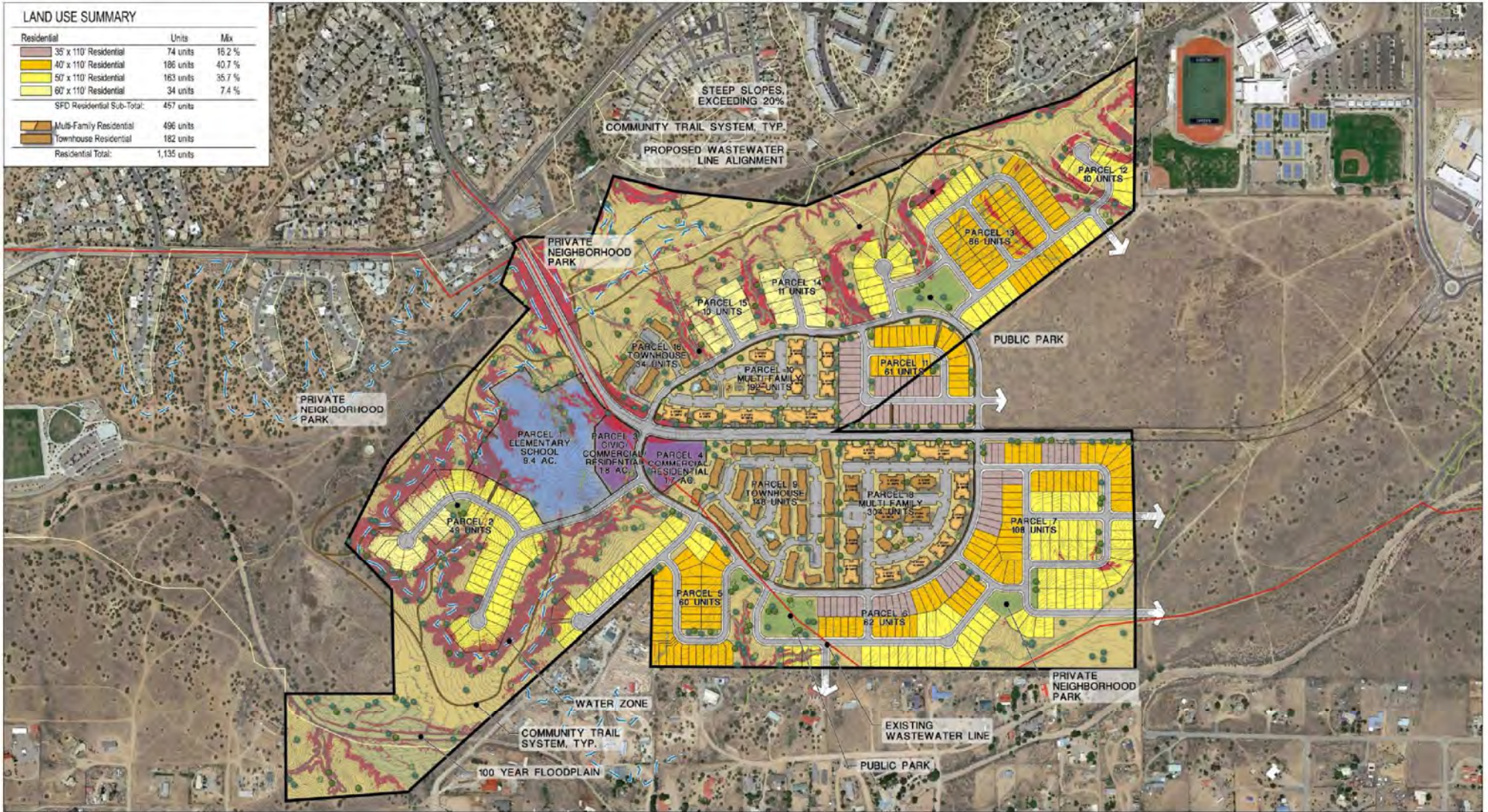
Google Earth

© 2020 Google

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LAND USE SUMMARY

Residential	Units	Mix
35' x 110' Residential	74 units	16.2 %
40' x 110' Residential	186 units	40.7 %
50' x 110' Residential	163 units	35.7 %
60' x 110' Residential	34 units	7.4 %
SFD Residential Sub-Total:	457 units	
Multi-Family Residential	496 units	
Townhouse Residential	182 units	
Residential Total:	1,135 units	



LOTTING PLAN C
PHASE 3A TIERRA CONTENTA
 SANTA FE, NEW MEXICO

SHEET FILE: C:\projects\0050\Lotting C Rev1.dwg
 Base mapping compiled from best available information. All map data should be considered as preliminary, in need of verification, and subject to change. This lotting plan is conceptual in nature and does not represent any regulatory approval. Plan is subject to change.

FIGURE 2 SITE PLAN

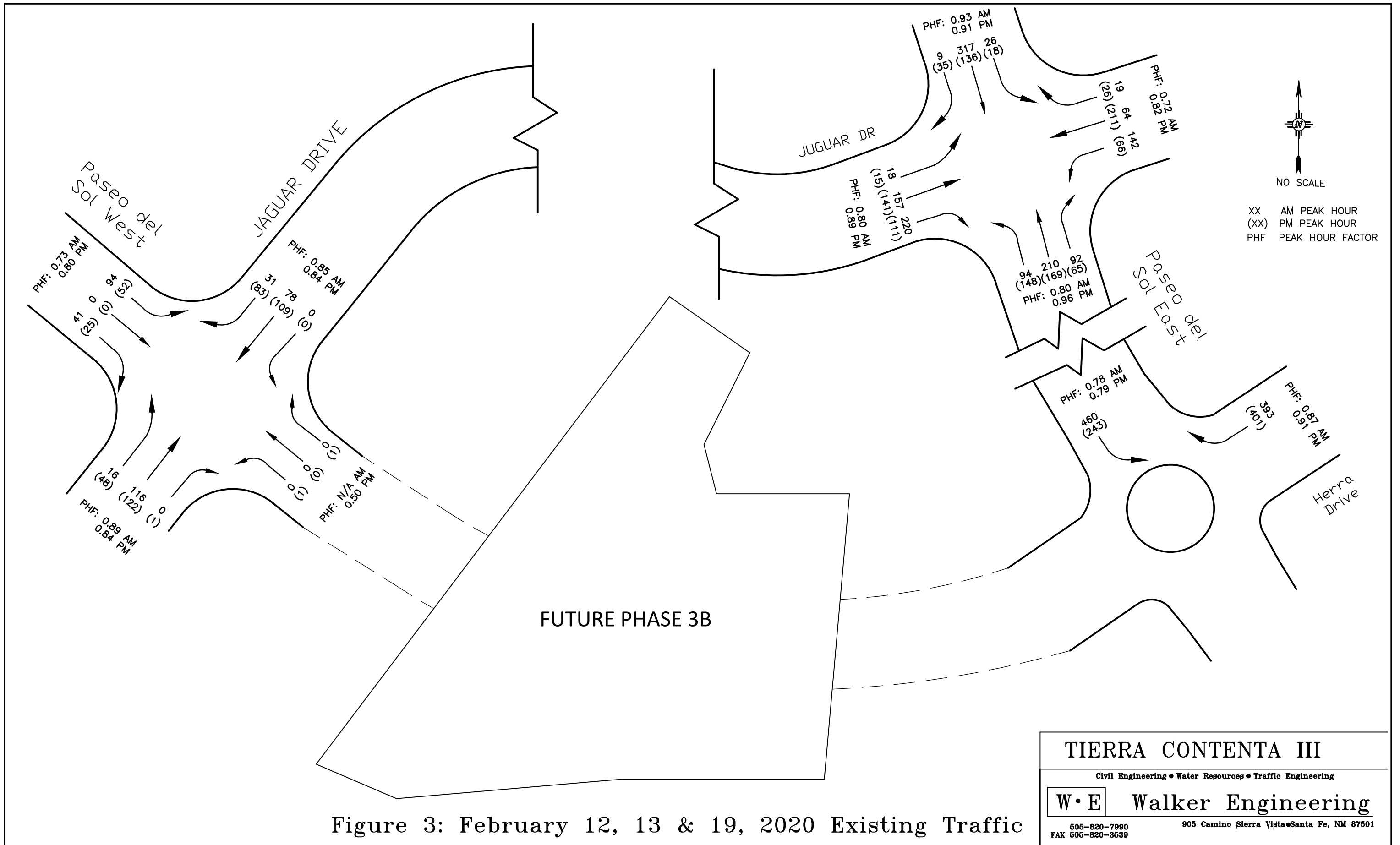


Figure 3: February 12, 13 & 19, 2020 Existing Traffic

TIERRA CONTENTA III
 Civil Engineering • Water Resources • Traffic Engineering

W•E Walker Engineering
 505-820-7990 905 Camino Sierra Vista Santa Fe, NM 87501
 FAX 505-820-3539

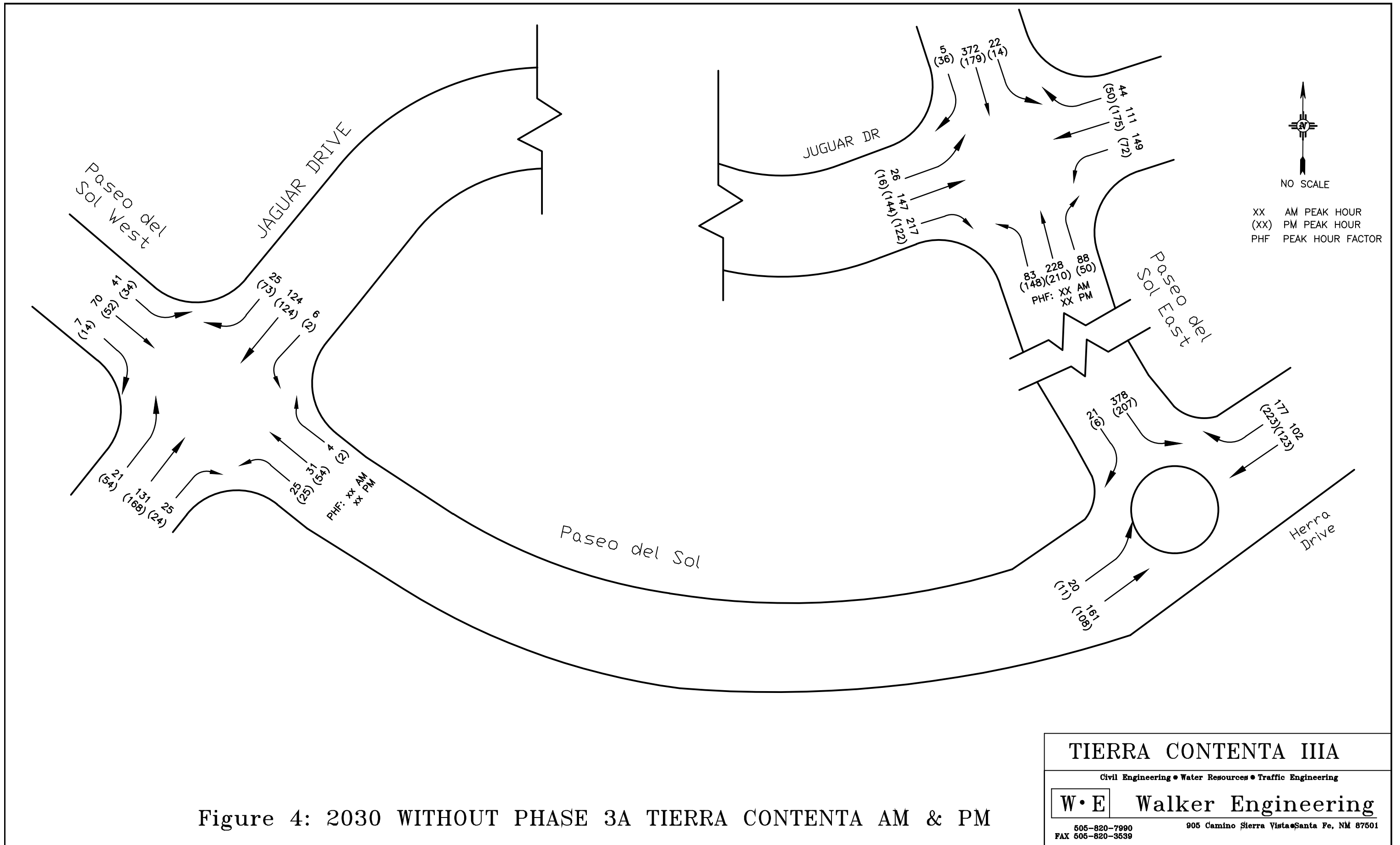


Figure 4: 2030 WITHOUT PHASE 3A TIERRA CONTENTA AM & PM

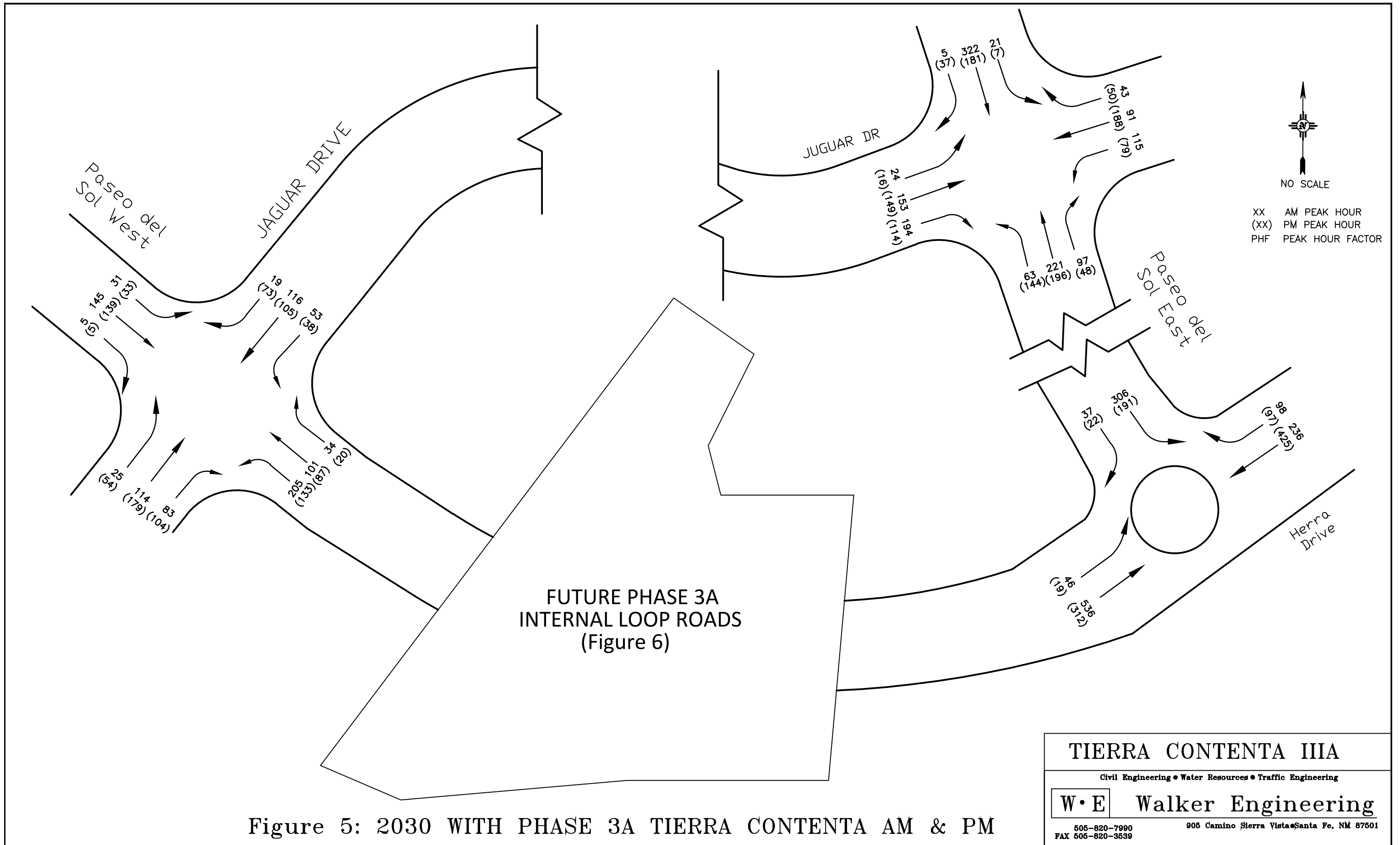


Figure 5: 2030 WITH PHASE 3A TIERRA CONTENTA AM & PM

TIERRA CONTENTA IIIA	
Civil Engineering • Water Resources • Traffic Engineering	
W•E	Walker Engineering
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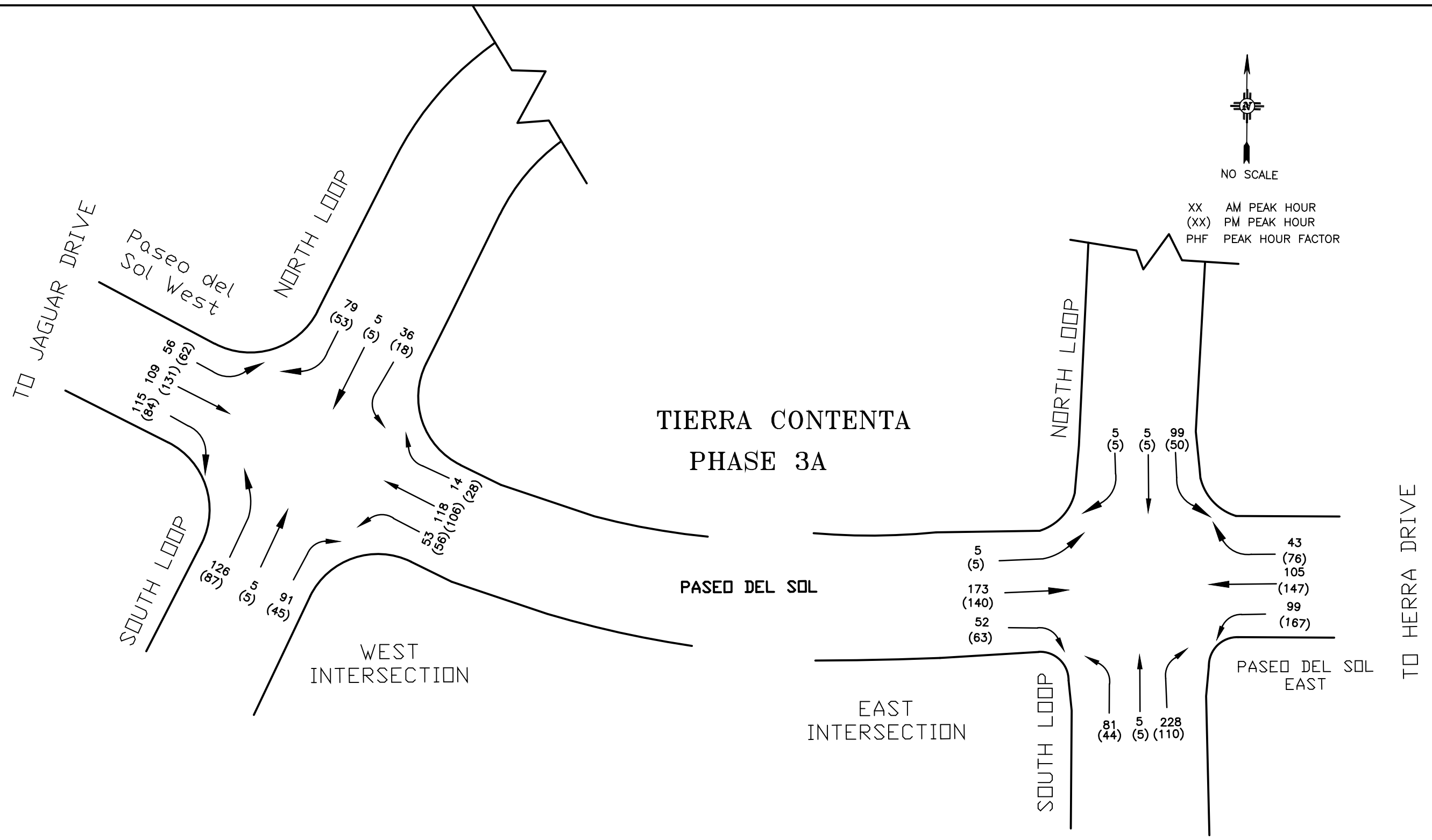


Figure 6: 2030 INTERNAL LOOP ROADS AM & PM

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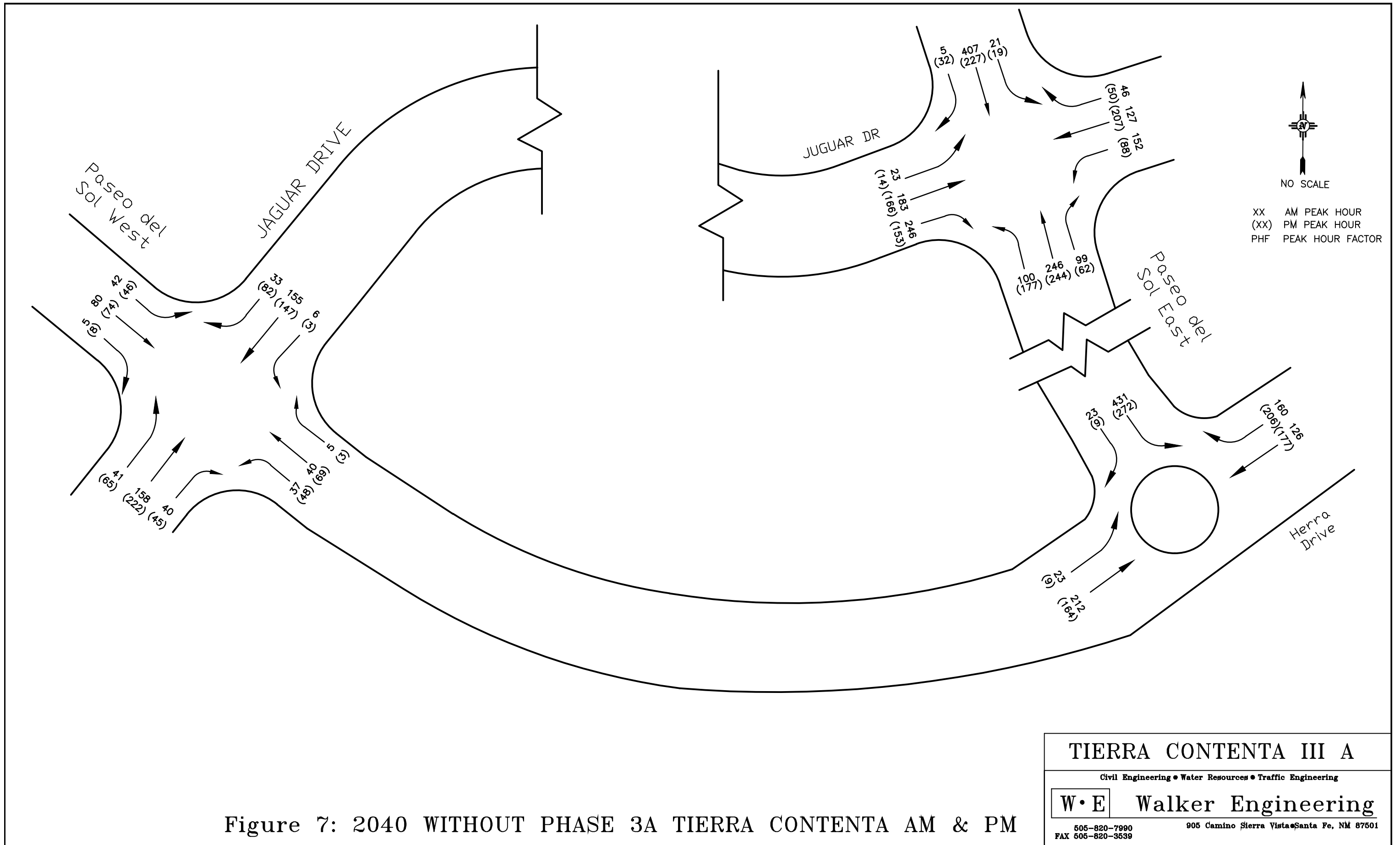


Figure 7: 2040 WITHOUT PHASE 3A TIERRA CONTENTA AM & PM

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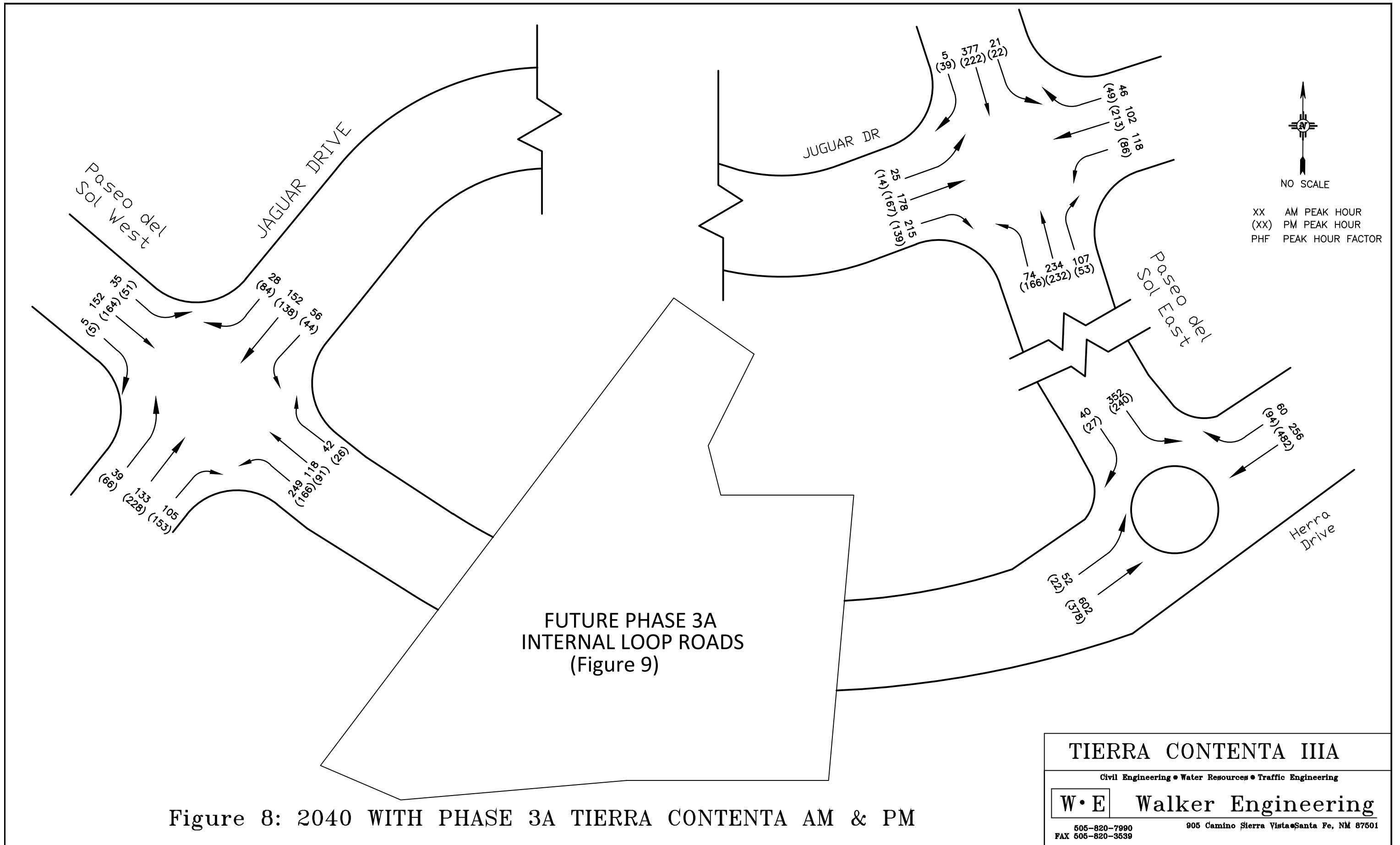


Figure 8: 2040 WITH PHASE 3A TIERRA CONTENTA AM & PM



XX AM PEAK HOUR
 (XX) PM PEAK HOUR
 PHF PEAK HOUR FACTOR

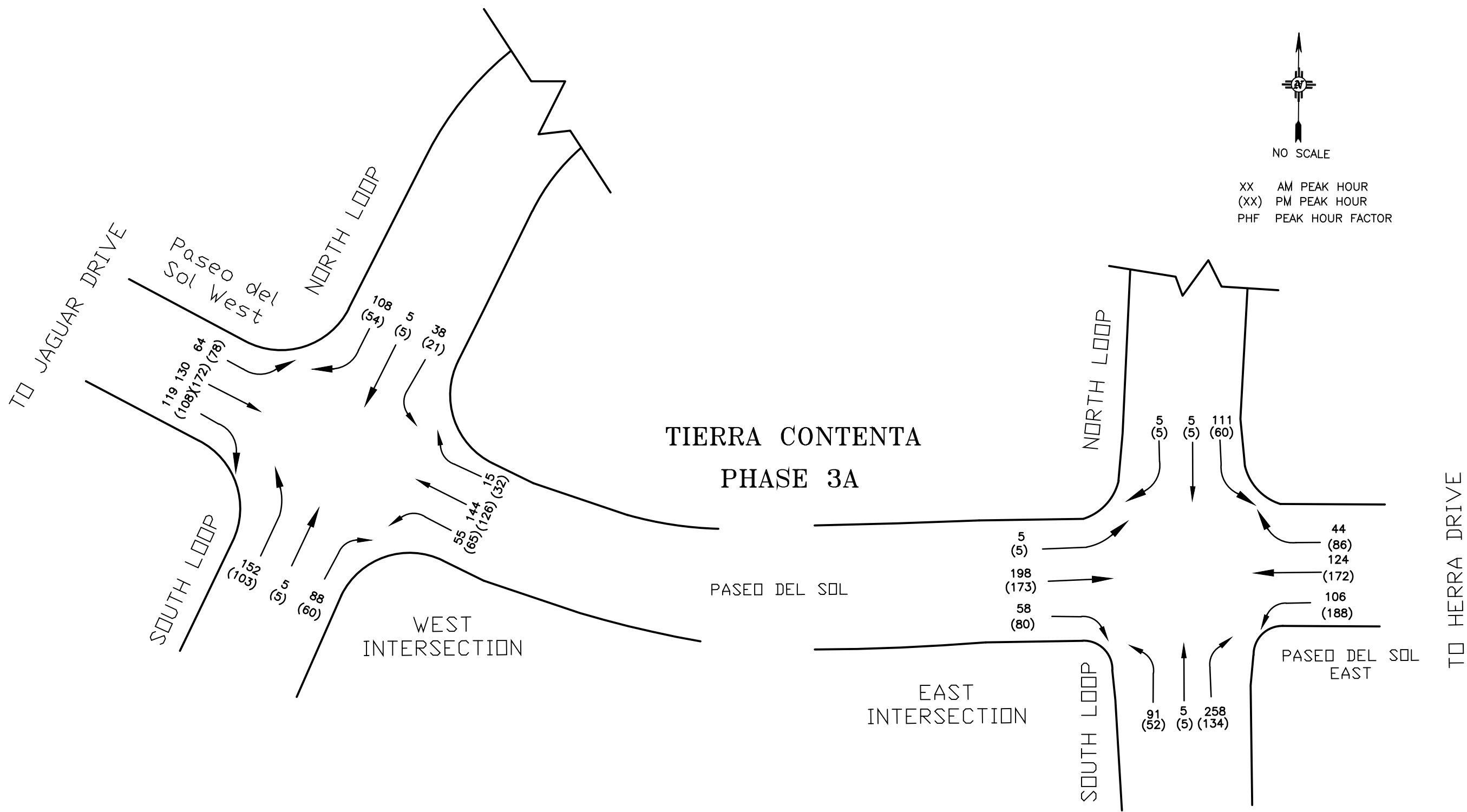


Figure 9: 2040 INTERNAL LOOP ROADS AM & PM

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Tierra Contenta Phase 3A

Traffic Impact Analysis

APPENDIX A

Traffic Counts

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive

West Intersection
Feb 12, 2020

File Name : West Paseo Real and Jaguar Dr AM 2020
Site Code : 00000000
Start Date : 02/12/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	8	0	5	13	7	17	0	24	0	0	0	0	0	13	3	16	53
07:15 AM	11	0	27	38	1	8	0	9	0	0	0	0	0	20	1	21	68
07:30 AM	13	0	33	46	6	20	0	26	0	0	0	0	0	33	1	34	106
07:45 AM	7	0	17	24	9	21	0	30	0	0	0	0	0	30	7	37	91
Total	39	0	82	121	23	66	0	89	0	0	0	0	0	96	12	108	318
08:00 AM	9	0	20	29	9	23	0	32	0	0	0	0	0	28	4	32	93
08:15 AM	12	0	24	36	7	14	0	21	0	0	0	0	0	25	4	29	86
08:30 AM	9	0	8	17	3	16	0	19	0	0	0	0	0	17	2	19	55
08:45 AM	10	0	5	15	9	15	0	24	0	0	0	0	0	24	7	31	70
Total	40	0	57	97	28	68	0	96	0	0	0	0	0	94	17	111	304
Grand Total	79	0	139	218	51	134	0	185	0	0	0	0	0	190	29	219	622
Apprch %	36.2	0.0	63.8		27.6	72.4	0.0		0.0	0.0	0.0		0.0	86.8	13.2		
Total %	12.7	0.0	22.3	35.0	8.2	21.5	0.0	29.7	0.0	0.0	0.0	0.0	0.0	30.5	4.7	35.2	

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive

West Intersection
Feb 12, 2020

File Name : West Paseo Real and Jaguar Dr AM 2020
Site Code : 00000000
Start Date : 02/12/2020
Page No : 2

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:30 AM																
Volume	41	0	94	135	31	78	0	109	0	0	0	0	0	116	16	132	376
Percent	30.4	0.0	69.6		28.4	71.6	0.0		0.0	0.0	0.0		0.0	87.9	12.1		
07:30 Volume	13	0	33	46	6	20	0	26	0	0	0	0	0	33	1	34	106
Peak Factor																	0.887
High Int.	07:30 AM				08:00 AM				6:45:00 AM				07:45 AM				
Volume	13	0	33	46	9	23	0	32	0	0	0	0	0	30	7	37	
Peak Factor	0.734				0.852								0.892				
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
By Approach	07:15 AM				07:30 AM				07:00 AM				07:30 AM				
Volume	40	0	97	137	31	78	0	109	0	0	0	0	0	116	16	132	
Percent	29.2	0.0	70.8		28.4	71.6	0.0		-	-	-		0.0	87.9	12.1		
High Int.	07:30 AM				08:00 AM								07:45 AM				
Volume	13	0	33	46	9	23	0	32	-	-	-	-	0	30	7	37	
Peak Factor	0.745				0.852								0.892				

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive

West Intersection
Feb 12, 2020

File Name : West Paseo Real and Jaguar Dr PM 2020
Site Code : 00000000
Start Date : 02/12/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	5	0	7	12	13	25	1	39	1	0	0	1	0	23	6	29	81
04:15 PM	3	0	12	15	13	22	0	35	0	0	0	0	0	10	9	19	69
04:30 PM	6	0	12	18	25	15	0	40	0	0	0	0	0	18	6	24	82
04:45 PM	3	0	11	14	19	25	0	44	0	0	0	0	0	16	7	23	81
Total	17	0	42	59	70	87	1	158	1	0	0	1	0	67	28	95	313
05:00 PM	10	0	14	24	20	34	0	54	0	0	0	0	0	22	11	33	111
05:15 PM	4	0	14	18	26	31	0	57	0	0	1	1	1	39	11	51	127
05:30 PM	9	0	8	17	24	25	0	49	0	0	0	0	0	34	12	46	112
05:45 PM	2	0	16	18	13	19	0	32	1	0	0	1	0	27	14	41	92
Total	25	0	52	77	83	109	0	192	1	0	1	2	1	122	48	171	442
Grand Total	42	0	94	136	153	196	1	350	2	0	1	3	1	189	76	266	755
Apprch %	30.9	0.0	69.1		43.7	56.0	0.3		66.7	0.0	33.3		0.4	71.1	28.6		
Total %	5.6	0.0	12.5	18.0	20.3	26.0	0.1	46.4	0.3	0.0	0.1	0.4	0.1	25.0	10.1	35.2	

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive
West Intersection
Feb 12, 2020

File Name : West Paseo Real and Jaguar Dr PM 2020
Site Code : 00000000
Start Date : 02/12/2020
Page No : 2

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	05:00 PM																
Volume	25	0	52	77	83	109	0	192	1	0	1	2	1	122	48	171	442
Percent	32.5	0.0	67.5		43.2	56.8	0.0		50.0	0.0	50.0		0.6	71.3	28.1		
05:15 Volume	4	0	14	18	26	31	0	57	0	0	1	1	1	39	11	51	127
Peak Factor																	0.870
High Int.	05:00 PM				05:15 PM				05:15 PM				05:15 PM				
Volume	10	0	14	24	26	31	0	57	0	0	1	1	1	39	11	51	
Peak Factor	0.802				0.842				0.500				0.838				
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
By Approach	05:00 PM				04:45 PM				05:00 PM				05:00 PM				
Volume	25	0	52	77	89	115	0	204	1	0	1	2	1	122	48	171	
Percent	32.5	0.0	67.5		43.6	56.4	0.0		50.0	0.0	50.0		0.6	71.3	28.1		
High Int.	05:00 PM				05:15 PM				05:15 PM				05:15 PM				
Volume	10	0	14	24	26	31	0	57	0	0	1	1	1	39	11	51	
Peak Factor	0.802				0.895				0.500				0.838				

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive
East Intersection
Feb 13, 2020

File Name : Paseo Real and Jaguar Dr AM 2020
Site Code : 00000000
Start Date : 02/13/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Paseo Del Sol From North				Jaguar Drive From East				Paseo Del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	1	24	4	29	1	6	2	9	7	21	7	35	20	33	1	54	127
07:15 AM	1	32	2	35	2	6	8	16	4	13	3	20	38	53	1	92	163
07:30 AM	0	62	3	65	1	9	21	31	15	22	18	55	71	59	7	137	288
07:45 AM	2	84	9	95	8	13	24	45	14	34	22	70	67	49	7	123	333
Total	4	202	18	224	12	34	55	101	40	90	50	180	196	194	16	406	911
08:00 AM	3	78	9	90	3	22	27	52	17	62	34	113	35	40	4	79	334
08:15 AM	2	86	5	93	4	17	57	78	31	39	19	89	66	31	4	101	361
08:30 AM	2	69	3	74	4	12	34	50	30	75	19	124	52	37	3	92	340
08:45 AM	3	26	1	30	2	12	10	24	15	27	11	53	17	36	2	55	162
Total	10	259	18	287	13	63	128	204	93	203	83	379	170	144	13	327	1197
Grand Total	14	461	36	511	25	97	183	305	133	293	133	559	366	338	29	733	2108
Apprch %	2.7	90.2	7.0		8.2	31.8	60.0		23.8	52.4	23.8		49.9	46.1	4.0		
Total %	0.7	21.9	1.7	24.2	1.2	4.6	8.7	14.5	6.3	13.9	6.3	26.5	17.4	16.0	1.4	34.8	

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive
East Intersection
Feb 13, 2020

File Name : Paseo Real and Jaguar Dr AM 2020
Site Code : 00000000
Start Date : 02/13/2020
Page No : 2

Start Time	Paseo Del Sol From North				Jaguar Drive From East				Paseo Del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Intersection	07:45 AM																
Volume	9	317	26	352	19	64	142	225	92	210	94	396	220	157	18	395	1368
Percent	2.6	90.1	7.4		8.4	28.4	63.1		23.2	53.0	23.7		55.7	39.7	4.6		
08:15 Volume	2	86	5	93	4	17	57	78	31	39	19	89	66	31	4	101	361
Peak Factor																	0.947
High Int.	07:45 AM				08:15 AM				08:30 AM				07:45 AM				
Volume	2	84	9	95	4	17	57	78	30	75	19	124	67	49	7	123	
Peak Factor	0.926				0.721				0.798				0.803				
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1																	
By Approach	07:45 AM				07:45 AM				07:45 AM				07:30 AM				
Volume	9	317	26	352	19	64	142	225	92	210	94	396	239	179	22	440	
Percent	2.6	90.1	7.4		8.4	28.4	63.1		23.2	53.0	23.7		54.3	40.7	5.0		
High Int.	07:45 AM				08:15 AM				08:30 AM				07:30 AM				
Volume	2	84	9	95	4	17	57	78	30	75	19	124	71	59	7	137	
Peak Factor	0.926				0.721				0.798				0.803				

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive
East Intersection
Feb 13, 2020

File Name : Paseo Real and Jaguar Dr PM 2020
Site Code : 00000000
Start Date : 02/13/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	8	38	5	51	5	44	18	67	20	83	46	149	19	37	14	70	337
04:15 PM	5	23	5	33	9	47	6	62	20	52	40	112	18	38	5	61	268
04:30 PM	6	29	3	38	5	52	12	69	15	36	36	87	20	20	3	43	237
04:45 PM	10	35	7	52	10	44	15	69	14	43	34	91	27	34	3	64	276
Total	29	125	20	174	29	187	51	267	69	214	156	439	84	129	25	238	1118
05:00 PM	9	32	3	44	4	50	17	71	20	36	42	98	27	41	7	75	288
05:15 PM	6	29	6	41	5	67	20	92	12	47	34	93	24	42	3	69	295
05:30 PM	10	40	2	52	7	50	14	71	19	43	38	100	33	24	2	59	282
05:45 PM	7	41	6	54	2	45	17	64	12	43	27	82	27	38	4	69	269
Total	32	142	17	191	18	212	68	298	63	169	141	373	111	145	16	272	1134
Grand Total	61	267	37	365	47	399	119	565	132	383	297	812	195	274	41	510	2252
Apprch %	16.7	73.2	10.1		8.3	70.6	21.1		16.3	47.2	36.6		38.2	53.7	8.0		
Total %	2.7	11.9	1.6	16.2	2.1	17.7	5.3	25.1	5.9	17.0	13.2	36.1	8.7	12.2	1.8	22.6	

Tierra Contenta Phase 3A
Paseo del Sol & Jaguar Drive
East Intersection
Feb 13, 2020

File Name : Paseo Real and Jaguar Dr PM 2020
Site Code : 00000000
Start Date : 02/13/2020
Page No : 2

Start Time	Paseo del Sol From North				Jaguar Drive From East				Paseo del Sol From South				Jaguar Drive From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Intersection	04:45 PM																
Volume	35	136	18	189	26	211	66	303	65	169	148	382	111	141	15	267	1141
Percent	18.5	72.0	9.5		8.6	69.6	21.8		17.0	44.2	38.7		41.6	52.8	5.6		
05:15 Volume	6	29	6	41	5	67	20	92	12	47	34	93	24	42	3	69	295
Peak Factor																	0.967
High Int.	04:45 PM				05:15 PM				05:30 PM				05:00 PM				
Volume	10	35	7	52	5	67	20	92	19	43	38	100	27	41	7	75	
Peak Factor	0.909				0.823				0.955				0.890				
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																	
By Approach	05:00 PM				04:45 PM				04:00 PM				05:00 PM				
Volume	32	142	17	191	26	211	66	303	69	214	156	439	111	145	16	272	
Percent	16.8	74.3	8.9		8.6	69.6	21.8		15.7	48.7	35.5		40.8	53.3	5.9		
High Int.	05:45 PM				05:15 PM				04:00 PM				05:00 PM				
Volume	7	41	6	54	5	67	20	92	20	83	46	149	27	41	7	75	
Peak Factor	0.884				0.823				0.737				0.907				

Tierra Contenta Phase 3A
Paseo del Sol & Herrera Drive
~~Western~~ Intersection
Feb 12, 2020

File Name : Paseo Real and Circle AM 2020
Site Code : 00000000
Start Date : 02/19/2020
Page No : 1

Groups Printed- Unshifted

Start Time	PASEO EAST From North				Herrera Drive From East				App. Total	CIRCLE From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total		Right	Thru	Left	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0			1.0	1.0	1.0		
07:00 AM	0	1	41	42	29	0	0	29	0	0	0	0	0	71
07:15 AM	0	0	99	99	51	0	0	51	0	0	0	0	0	150
07:30 AM	0	0	148	148	99	0	0	99	0	0	0	0	0	247
07:45 AM	0	0	137	137	87	0	0	87	0	0	0	0	0	224
Total	0	1	425	426	266	0	0	266	0	0	0	0	0	692
08:00 AM	0	0	95	95	94	0	0	94	0	0	0	0	0	189
08:15 AM	0	0	80	80	113	0	0	113	0	0	0	0	0	193
08:30 AM	0	0	78	78	59	0	0	59	0	0	0	0	0	137
08:45 AM	0	0	43	43	34	0	0	34	0	0	0	0	0	77
Total	0	0	296	296	300	0	0	300	0	0	0	0	0	596
Grand Total	0	1	721	722	566	0	0	566	0	0	0	0	0	1288
Apprch %	0.0	0.1	99.9		100.0	0.0	0.0			0.0	0.0	0.0		
Total %	0.0	0.1	56.0	56.1	43.9	0.0	0.0	43.9	0.0	0.0	0.0	0.0	0.0	

Tierra Contenta Phase 3A
Paseo del Sol & Herrera Drive
~~Western~~ Intersection
Feb 12, 2020

File Name : Paseo Real and Circle AM 2020
Site Code : 00000000
Start Date : 02/19/2020
Page No : 2

Start Time	PASEO EAST From North				Herrera Drive From East				App. Total	App. Total	CIRCLE From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total			Right	Thru	Left	App. Total	
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1															
Intersection	07:30 AM														
Volume	0	0	460	460	393	0	0	393	0	0	0	0	0	853	
Percent	0.0	0.0	100.0		100.0	0.0	0.0			0.0	0.0	0.0			
07:30 Volume	0	0	148	148	99	0	0	99	0	0	0	0	0	247	
Peak Factor															0.863
High Int.	07:30 AM				08:15 AM				6:45:00 AM	6:45:00 AM					
Volume	0	0	148	148	113	0	0	113							
Peak Factor	0.777								0.869						
Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1															
By Approach	07:15 AM				07:30 AM				07:00 AM	07:00 AM					
Volume	0	0	479	479	393	0	0	393	0	0	0	0	0		
Percent	0.0	0.0	100.0		100.0	0.0	0.0			-	-	-	-		
High Int.	07:30 AM				08:15 AM				-	-					
Volume	0	0	148	148	113	0	0	113	-	-	-	-	-		
Peak Factor	0.809								0.869						

Tierra Contenta Phase 3A
Paseo del Sol & Herrera Drive
~~Western~~ Intersection
Feb 12, 2020

File Name : Paseo Real and Circle PM 2020
Site Code : 00000000
Start Date : 02/19/2020
Page No : 1

Groups Printed- Unshifted

Start Time	Paseo del Sol From North				Herra Drive From East				App. Total	CIRCLE From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total		App. Total	Right	Thru	Left	
Factor	1.0	1.0	1.0		1.0	1.0	1.0			1.0	1.0	1.0		
04:00 PM	0	0	81	81	79	0	0	79	0	6	0	0	6	166
04:15 PM	0	0	47	47	93	0	0	93	0	0	0	0	0	140
04:30 PM	0	0	52	52	96	1	0	97	0	0	0	0	0	149
04:45 PM	0	0	55	55	93	0	0	93	0	0	0	0	0	148
Total	0	0	235	235	361	1	0	362	0	6	0	0	6	603
05:00 PM	0	0	77	77	111	0	0	111	0	0	1	1	2	190
05:15 PM	0	0	59	59	101	0	0	101	0	0	0	0	0	160
05:30 PM	0	0	57	57	92	0	0	92	0	0	0	0	0	149
05:45 PM	0	0	37	37	80	0	0	80	0	0	0	0	0	117
Total	0	0	230	230	384	0	0	384	0	0	1	1	2	616
Grand Total	0	0	465	465	745	1	0	746	0	6	1	1	8	1219
Apprch %	0.0	0.0	100.0		99.9	0.1	0.0			75.0	12.5	12.5		
Total %	0.0	0.0	38.1	38.1	61.1	0.1	0.0	61.2	0.0	0.5	0.1	0.1	0.7	

Tierra Contenta Phase 3A
Paseo del Sol & Herrera Drive
[REDACTED] Intersection
Feb 12, 2020

File Name : Paseo Real and Circle PM 2020
Site Code : 00000000
Start Date : 02/19/2020
Page No : 2

Start Time	Paseo del Sol From North				Herra Drive From East				App. Total	CIRCLE From West				Int. Total
	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total		Right	Thru	Left	App. Total	
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1														
Intersection	04:30 PM													
Volume	0	0	243	243	401	1	0	402	0	0	1	1	2	647
Percent	0.0	0.0	100.0		99.8	0.2	0.0			0.0	50.0	50.0		
05:00 Volume	0	0	77	77	111	0	0	111	0	0	1	1	2	190
Peak Factor														0.851
High Int.	05:00 PM				05:00 PM				3:45:00 PM	05:00 PM				
Volume	0	0	77	77	111	0	0	111	0	0	1	1	2	
Peak Factor	0.789								0.905	0.250				
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1														
By Approach	04:45 PM				04:30 PM				04:00 PM	04:00 PM				
Volume	0	0	248	248	401	1	0	402	0	6	0	0	6	
Percent	0.0	0.0	100.0		99.8	0.2	0.0			100.0	0.0	0.0		
High Int.	05:00 PM				05:00 PM				-	04:00 PM				
Volume	0	0	77	77	111	0	0	111	-	6	0	0	6	
Peak Factor	0.805								0.905	0.250				

Tierra Contenta Phase 3A

Traffic Impact Analysis

Appendix B

VISUM Traffic Generation & Distribution

VIANODE\Intersection Name	FROM LINK	TO LINK	ORIENTATION	2020		2030 Without TC		2030 With TC		2040 Without TC		2040 With TC	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Jaguar & Paseo del Sol East	Paseo del Sol	Jaguar Dr	EBL	26	18	22	14	21	7	21	19	21	22
		Jaguar Dr	EBR	9	35	5	36	5	37	5	32	5	39
		Paseo del Sol	EBT	317	136	372	179	322	181	407	227	377	222
	Jaguar Dr	Paseo del Sol	NBL	28	15	26	16	24	16	23	14	25	14
		Paseo del Sol	NBR	220	111	217	122	194	114	246	153	215	139
		Jaguar Dr	NBT	157	141	147	144	153	149	183	166	178	167
	Paseo del Sol	Paseo del Sol	SBL	142	66	149	72	115	79	152	88	118	86
		Paseo del Sol	SBR	45	55	44	50	43	50	46	50	46	49
		Jaguar Dr	SBT	114	163	111	175	91	188	127	207	102	213
		Jaguar Dr	WBL	94	148	83	148	63	144	100	177	74	166
		Jaguar Dr	WBR	92	65	88	50	97	48	99	62	107	53
		Paseo del Sol	WBT	210	169	228	210	221	196	246	244	234	232
		Jaguar Dr	WBT	210	169	228	210	221	196	246	244	234	232
Jaguar & Paseo del Sol West	Paseo del Sol	Jaguar Dr	EBL	66	39	41	34	31	33	42	46	35	51
		Jaguar Dr	EBR	41	25	7	14	5	5	5	8	5	5
		Paseo del Sol	EBT	2	0	70	52	145	139	80	74	152	164
	Jaguar Dr	Paseo del Sol	NBL	16	48	21	54	25	54	41	65	39	66
		Paseo del Sol	NBR	1	1	25	24	83	104	40	45	105	153
		Jaguar Dr	NBT	116	122	131	168	114	179	158	222	133	228
	Paseo del Sol	Paseo del Sol	SBL	2	1	6	2	53	38	6	3	56	44
		Paseo del Sol	SBR	31	83	25	73	19	73	33	82	28	84
		Jaguar Dr	SBT	81	80	124	124	116	105	155	147	152	138
		Jaguar Dr	WBL	2	1	25	25	205	133	37	48	249	166
		Jaguar Dr	WBR	3	1	4	2	34	20	5	3	42	26
		Paseo del Sol	WBT	1	0	31	54	101	87	40	69	118	91
		Jaguar Dr	WBT	1	0	31	54	101	87	40	69	118	91
Herrera & Paseo del Sol East	Paseo del Sol	Paseo del Sol	NBL	0	0	20	11	46	19	23	9	52	22
		Herrera Drive	NBR	0	0	161	108	536	312	212	164	602	378
		Paseo del Sol	NBT	0	0	0	0	0	0	0	0	0	0
	Herrera Drive	Herrera Drive	SBL	480	243	378	207	306	191	431	272	352	240
		Paseo del Sol	SBR	0	0	21	6	37	22	23	9	40	27
		Paseo del Sol	WBR	273	329	177	223	98	97	160	206	60	94
		Paseo del Sol	WBT	0	0	102	123	236	425	126	177	256	482

VIANODE\Intersection Name	FROM LINK	TO LINK	ORIENTATION	2020		2030 Without TC		2030 With TC		2040 Without TC		2040 With TC	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Paseo del Sol & W. Intersection	Paseo del Sol	North Loop	EBL	0	0	0	0	56	62	0	0	64	78
		South Loop	EBR	0	0	0	0	115	84	0	0	119	108
		Paseo del Sol	EBT	0	0	99	76	109	131	124	120	130	172
	South Loop	Paseo del Sol	NBL	0	0	0	0	126	87	0	0	152	103
		Paseo del Sol	NBR	0	0	0	0	79	53	0	0	88	60
		North Loop	NBT	0	0	0	0	5	5	0	0	5	5
	North Loop	Paseo del Sol	SBL	0	0	0	0	36	18	0	0	38	21
		Paseo del Sol	SBR	0	0	0	0	91	45	0	0	108	54
		South Loop	SBT	0	0	0	0	5	5	0	0	5	5
	Paseo del Sol	South Loop	WBL	0	0	0	0	53	56	0	0	55	65
		North Loop	WBR	0	0	0	0	14	28	0	0	15	32
		Paseo del Sol	WBT	0	0	58	81	118	106	78	119	144	126
		Paseo del Sol	WBU	0	0	0	0	0	0	0	0	0	0
	Paseo del Sol & E. Intersection	Paseo del Sol	North Loop	EBL	0	0	0	0	5	5	0	0	5
South Loop			EBR	0	0	0	0	52	63	0	0	58	80
Paseo del Sol			EBT	0	0	99	76	173	140	124	120	198	173
South Loop		Paseo del Sol	NBL	0	0	0	0	81	44	0	0	91	52
		Paseo del Sol	NBR	0	0	0	0	228	110	0	0	258	134
		North Loop	NBT	0	0	0	0	5	5	0	0	5	5
North Loop		Paseo del Sol	SBL	0	0	0	0	99	50	0	0	111	60
		Paseo del Sol	SBR	0	0	0	0	5	5	0	0	5	5
		South Loop	SBT	0	0	0	0	5	5	0	0	5	5
Paseo del Sol		South Loop	WBL	0	0	0	0	99	167	0	0	106	188
		North Loop	WBR	0	0	0	0	43	76	0	0	44	86
		Paseo del Sol	WBT	0	0	58	81	105	147	78	119	124	172

Tierra Contenta Phase 3A

Traffic Impact Analysis

Appendix C

Synchro 10 Western Intersection Jaguar Drive & Paseo del Sol

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵	↵		↵	↵		↵	↑		↵	↵	
Traffic Vol, veh/h	31	145	5	205	101	34	25	114	83	53	116	19
Future Vol, veh/h	31	145	5	205	101	34	25	114	83	53	116	19
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	199	7	223	110	37	28	128	93	62	136	22
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	13.1	13.6	13.4	12.2
HCM LOS	B	B	B	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	58%	0%	75%	0%	97%	0%	86%
Vol Right, %	0%	42%	0%	25%	0%	3%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	197	205	135	31	150	53	135
LT Vol	25	0	205	0	31	0	53	0
Through Vol	0	114	0	101	0	145	0	116
RT Vol	0	83	0	34	0	5	0	19
Lane Flow Rate	28	221	223	147	42	205	62	159
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.057	0.401	0.433	0.257	0.085	0.381	0.128	0.299
Departure Headway (Hd)	7.339	6.529	6.995	6.307	7.2	6.667	7.388	6.777
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	485	547	512	565	494	536	482	526
Service Time	5.133	4.322	4.779	4.091	4.992	4.458	5.185	4.574
HCM Lane V/C Ratio	0.058	0.404	0.436	0.26	0.085	0.382	0.129	0.302
HCM Control Delay	10.6	13.7	15.1	11.3	10.7	13.6	11.3	12.5
HCM Lane LOS	B	B	C	B	B	B	B	B
HCM 95th-tile Q	0.2	1.9	2.2	1	0.3	1.8	0.4	1.2

Intersection	
Intersection Delay, s/veh	14.7
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵	↵		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	33	139	5	135	87	20	54	179	104	38	105	73
Future Vol, veh/h	33	139	5	135	87	20	54	179	104	38	105	73
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	174	6	155	100	23	64	213	124	45	125	87
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	13.4	13.1	17.5	13.3
HCM LOS	B	B	C	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	63%	0%	81%	0%	97%	0%	59%
Vol Right, %	0%	37%	0%	19%	0%	3%	0%	41%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	283	135	107	33	144	38	178
LT Vol	54	0	135	0	33	0	38	0
Through Vol	0	179	0	87	0	139	0	105
RT Vol	0	104	0	20	0	5	0	73
Lane Flow Rate	64	337	155	123	41	180	45	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.129	0.606	0.328	0.238	0.088	0.359	0.094	0.395
Departure Headway (Hd)	7.247	6.475	7.599	6.954	7.717	7.18	7.513	6.708
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	495	559	473	517	464	500	477	536
Service Time	4.983	4.211	5.34	4.695	5.46	4.922	5.253	4.448
HCM Lane V/C Ratio	0.129	0.603	0.328	0.238	0.088	0.36	0.094	0.396
HCM Control Delay	11.1	18.7	14	11.9	11.2	13.9	11	13.8
HCM Lane LOS	B	C	B	B	B	B	B	B
HCM 95th-tile Q	0.4	4	1.4	0.9	0.3	1.6	0.3	1.9

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	35	152	5	249	118	42	39	133	105	56	152	28
Future Vol, veh/h	35	152	5	249	118	42	39	133	105	56	152	28
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	208	7	271	128	46	44	149	118	66	179	33
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	15.5	17.7	17.1	15.1
HCM LOS	C	C	C	C

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	56%	0%	74%	0%	97%	0%	84%
Vol Right, %	0%	44%	0%	26%	0%	3%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	238	249	160	35	157	56	180
LT Vol	39	0	249	0	35	0	56	0
Through Vol	0	133	0	118	0	152	0	152
RT Vol	0	105	0	42	0	5	0	28
Lane Flow Rate	44	267	271	174	48	215	66	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.098	0.535	0.579	0.338	0.107	0.449	0.148	0.44
Departure Headway (Hd)	8.027	7.196	7.699	6.999	8.051	7.514	8.102	7.476
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	446	500	468	513	444	477	442	481
Service Time	5.785	4.954	5.459	4.758	5.815	5.278	5.863	5.237
HCM Lane V/C Ratio	0.099	0.534	0.579	0.339	0.108	0.451	0.149	0.441
HCM Control Delay	11.7	18	20.6	13.3	11.8	16.3	12.3	16
HCM Lane LOS	B	C	C	B	B	C	B	C
HCM 95th-tile Q	0.3	3.1	3.6	1.5	0.4	2.3	0.5	2.2

Intersection	
Intersection Delay, s/veh	28
Intersection LOS	D

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵	↵		↵	↵		↵	↵		↵	↵	
Traffic Vol, veh/h	51	164	5	166	91	26	66	228	153	44	138	84
Future Vol, veh/h	51	164	5	166	91	26	66	228	153	44	138	84
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	205	6	191	105	30	79	271	182	52	164	100
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.5	17	45.2	19.3
HCM LOS	C	C	E	C

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	60%	0%	78%	0%	97%	0%	62%
Vol Right, %	0%	40%	0%	22%	0%	3%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	381	166	117	51	169	44	222
LT Vol	66	0	166	0	51	0	44	0
Through Vol	0	228	0	91	0	164	0	138
RT Vol	0	153	0	26	0	5	0	84
Lane Flow Rate	79	454	191	134	64	211	52	264
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.178	0.924	0.464	0.302	0.157	0.489	0.125	0.574
Departure Headway (Hd)	8.14	7.337	8.755	8.076	8.869	8.329	8.617	7.825
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	442	499	412	445	405	433	417	463
Service Time	5.853	5.049	6.504	5.825	6.618	6.078	6.335	5.543
HCM Lane V/C Ratio	0.179	0.91	0.464	0.301	0.158	0.487	0.125	0.57
HCM Control Delay	12.6	50.8	18.9	14.3	13.3	18.8	12.6	20.6
HCM Lane LOS	B	F	C	B	B	C	B	C
HCM 95th-tile Q	0.6	10.9	2.4	1.3	0.6	2.6	0.4	3.5

Tierra Contenta Phase 3A

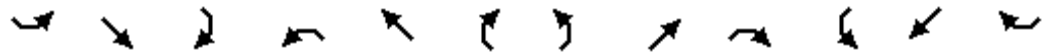
Traffic Impact Analysis

Appendix D

**Synchro 10 Eastern Intersection Jaguar Drive &
Paseo del Sol**

2030 Build Conditions
Jaguar & Paseo Del Sol

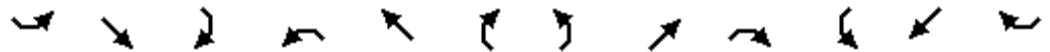
AM Peak
Eastern Intersection



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	322	5	63	221	97	24	153	194	115	91	43
Future Volume (veh/h)	21	322	5	63	221	97	24	153	194	115	91	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	402	6	79	276	121	30	191	242	160	126	60
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	624	9	343	451	198	458	225	285	273	406	193
Arrive On Green	0.03	0.34	0.34	0.05	0.37	0.37	0.03	0.30	0.30	0.07	0.34	0.34
Sat Flow, veh/h	1781	1838	27	1781	1233	540	1781	750	950	1781	1197	570
Grp Volume(v), veh/h	26	0	408	79	0	397	30	0	433	160	0	186
Grp Sat Flow(s),veh/h/ln	1781	0	1865	1781	0	1773	1781	0	1699	1781	0	1768
Q Serve(g_s), s	0.7	0.0	13.9	2.1	0.0	13.7	0.9	0.0	18.0	4.7	0.0	5.8
Cycle Q Clear(g_c), s	0.7	0.0	13.9	2.1	0.0	13.7	0.9	0.0	18.0	4.7	0.0	5.8
Prop In Lane	1.00		0.01	1.00		0.30	1.00		0.56	1.00		0.32
Lane Grp Cap(c), veh/h	326	0	634	343	0	648	458	0	510	273	0	599
V/C Ratio(X)	0.08	0.00	0.64	0.23	0.00	0.61	0.07	0.00	0.85	0.59	0.00	0.31
Avail Cap(c_a), veh/h	395	0	634	366	0	648	527	0	804	273	0	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	20.9	15.8	0.0	19.5	17.3	0.0	24.7	19.0	0.0	18.3
Incr Delay (d2), s/veh	0.1	0.0	5.0	0.3	0.0	4.3	0.1	0.0	5.1	3.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	6.6	0.8	0.0	6.1	0.3	0.0	7.5	2.0	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	0.0	25.9	16.2	0.0	23.7	17.4	0.0	29.8	22.2	0.0	18.6
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		434			476			463				346
Approach Delay, s/veh		25.3			22.5			29.0				20.3
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	31.9	9.5	27.0	8.5	30.0	6.6	29.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.7	15.7	6.7	20.0	4.1	15.9	2.9	7.8				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.6	0.0	1.7	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			24.5									
HCM 6th LOS			C									

2030 Build Conditions
Jaguar & Paseo Del Sol






















PM Peak
Eastern Intersection



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	7	181	37	144	196	48	16	149	114	79	188	50
Future Volume (veh/h)	7	181	37	144	196	48	16	149	114	79	188	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	199	41	150	204	50	20	182	139	89	211	56
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.82	0.82	0.82	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	462	472	97	506	556	136	326	223	171	297	383	102
Arrive On Green	0.01	0.31	0.31	0.08	0.38	0.38	0.02	0.23	0.23	0.07	0.27	0.27
Sat Flow, veh/h	1781	1505	310	1781	1451	356	1781	984	751	1781	1424	378
Grp Volume(v), veh/h	8	0	240	150	0	254	20	0	321	89	0	267
Grp Sat Flow(s),veh/h/ln	1781	0	1815	1781	0	1806	1781	0	1735	1781	0	1802
Q Serve(g_s), s	0.2	0.0	6.0	3.1	0.0	5.8	0.5	0.0	10.1	2.1	0.0	7.3
Cycle Q Clear(g_c), s	0.2	0.0	6.0	3.1	0.0	5.8	0.5	0.0	10.1	2.1	0.0	7.3
Prop In Lane	1.00		0.17	1.00		0.20	1.00		0.43	1.00		0.21
Lane Grp Cap(c), veh/h	462	0	569	506	0	692	326	0	394	297	0	485
V/C Ratio(X)	0.02	0.00	0.42	0.30	0.00	0.37	0.06	0.00	0.82	0.30	0.00	0.55
Avail Cap(c_a), veh/h	598	0	569	519	0	692	439	0	544	335	0	565
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	15.6	11.1	0.0	12.7	16.5	0.0	21.1	16.1	0.0	18.0
Incr Delay (d2), s/veh	0.0	0.0	2.3	0.3	0.0	1.5	0.1	0.0	6.7	0.6	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.6	1.1	0.0	2.3	0.2	0.0	4.4	0.8	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	17.9	11.4	0.0	14.2	16.6	0.0	27.7	16.6	0.0	19.0
LnGrp LOS	B	A	B	B	A	B	B	A	C	B	A	B
Approach Vol, veh/h		248			404			341				356
Approach Delay, s/veh		17.7			13.2			27.1				18.4
Approach LOS		B			B			C				B
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.1	26.5	8.3	17.5	9.1	22.5	5.9	20.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.2	7.8	4.1	12.1	5.1	8.0	2.5	9.3				
Green Ext Time (p_c), s	0.0	1.0	0.0	1.0	0.0	0.9	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay				18.9								
HCM 6th LOS				B								

2040 Build Conditions
Jaguar & Paseo Del Sol

AM Peak
East Intersection

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	377	5	74	234	107	25	178	215	118	102	46
Future Volume (veh/h)	21	377	5	74	234	107	25	178	215	118	102	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	471	6	92	292	134	31	222	269	164	142	64
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	280	596	8	273	425	195	473	254	308	257	446	201
Arrive On Green	0.03	0.32	0.32	0.05	0.35	0.35	0.03	0.33	0.33	0.06	0.37	0.37
Sat Flow, veh/h	1781	1843	23	1781	1213	557	1781	770	933	1781	1221	550
Grp Volume(v), veh/h	26	0	477	92	0	426	31	0	491	164	0	206
Grp Sat Flow(s),veh/h/ln	1781	0	1866	1781	0	1770	1781	0	1702	1781	0	1771
Q Serve(g_s), s	0.8	0.0	18.3	2.7	0.0	16.2	0.9	0.0	21.4	4.8	0.0	6.6
Cycle Q Clear(g_c), s	0.8	0.0	18.3	2.7	0.0	16.2	0.9	0.0	21.4	4.8	0.0	6.6
Prop In Lane	1.00		0.01	1.00		0.31	1.00		0.55	1.00		0.31
Lane Grp Cap(c), veh/h	280	0	603	273	0	621	473	0	562	257	0	647
V/C Ratio(X)	0.09	0.00	0.79	0.34	0.00	0.69	0.07	0.00	0.87	0.64	0.00	0.32
Avail Cap(c_a), veh/h	343	0	603	288	0	621	536	0	766	257	0	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.2	0.0	24.3	18.4	0.0	21.9	16.6	0.0	24.9	19.4	0.0	18.0
Incr Delay (d2), s/veh	0.1	0.0	10.2	0.7	0.0	6.1	0.1	0.0	8.4	5.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	9.4	1.1	0.0	7.4	0.4	0.0	9.5	2.2	0.0	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	0.0	34.4	19.2	0.0	28.0	16.7	0.0	33.3	24.6	0.0	18.2
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		503			518			522				370
Approach Delay, s/veh		33.6			26.4			32.3				21.0
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.7	32.2	9.5	30.6	8.8	30.0	6.7	33.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.8	18.2	6.8	23.4	4.7	20.3	2.9	8.6				
Green Ext Time (p_c), s	0.0	1.6	0.0	2.6	0.0	1.4	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay				28.9								
HCM 6th LOS				C								

2040 Build Conditions
Jaguar & Paseo Del Sol

PM Peak
East Intersection



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	22	222	39	166	232	53	14	167	139	86	213	49
Future Volume (veh/h)	22	222	39	166	232	53	14	167	139	86	213	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	244	43	173	242	55	17	204	170	97	239	55
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.82	0.82	0.82	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	415	463	82	451	523	119	333	238	198	285	439	101
Arrive On Green	0.03	0.30	0.30	0.08	0.35	0.35	0.02	0.25	0.25	0.07	0.30	0.30
Sat Flow, veh/h	1781	1548	273	1781	1475	335	1781	943	786	1781	1471	338
Grp Volume(v), veh/h	24	0	287	173	0	297	17	0	374	97	0	294
Grp Sat Flow(s),veh/h/ln	1781	0	1821	1781	0	1810	1781	0	1729	1781	0	1809
Q Serve(g_s), s	0.6	0.0	7.9	3.9	0.0	7.6	0.4	0.0	12.4	2.3	0.0	8.2
Cycle Q Clear(g_c), s	0.6	0.0	7.9	3.9	0.0	7.6	0.4	0.0	12.4	2.3	0.0	8.2
Prop In Lane	1.00		0.15	1.00		0.19	1.00		0.45	1.00		0.19
Lane Grp Cap(c), veh/h	415	0	544	451	0	642	333	0	437	285	0	540
V/C Ratio(X)	0.06	0.00	0.53	0.38	0.00	0.46	0.05	0.00	0.86	0.34	0.00	0.54
Avail Cap(c_a), veh/h	514	0	544	451	0	642	444	0	517	314	0	541
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	0.0	17.6	12.9	0.0	15.0	16.3	0.0	21.5	16.0	0.0	17.7
Incr Delay (d2), s/veh	0.1	0.0	3.6	0.5	0.0	2.4	0.1	0.0	11.8	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	3.6	1.4	0.0	3.2	0.2	0.0	6.0	0.9	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	0.0	21.2	13.5	0.0	17.4	16.4	0.0	33.3	16.7	0.0	18.8
LnGrp LOS	B	A	C	B	A	B	B	A	C	B	A	B
Approach Vol, veh/h		311			470			391			391	
Approach Delay, s/veh		20.6			15.9			32.6			18.3	
Approach LOS		C			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	25.8	8.5	19.7	9.5	22.5	5.7	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.6	9.6	4.3	14.4	5.9	9.9	2.4	10.2				
Green Ext Time (p_c), s	0.0	1.1	0.0	0.8	0.0	1.0	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay			21.6									
HCM 6th LOS			C									

Tierra Contenta Phase 3A

Traffic Impact Analysis

Appendix E

Synchro 10 Herrera Drive and Paseo del Sol

Intersection			
Intersection Delay, s/veh	15.8		
Intersection LOS	C		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	633	364	373
Demand Flow Rate, veh/h	646	371	381
Vehicles Circulating, veh/h	340	51	262
Vehicles Exiting, veh/h	303	935	160
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	24.4	6.9	9.7
Approach LOS	C	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	646	371	381
Cap Entry Lane, veh/h	804	1074	870
Entry HV Adj Factor	0.980	0.981	0.979
Flow Entry, veh/h	633	364	373
Cap Entry, veh/h	788	1053	851
V/C Ratio	0.803	0.346	0.438
Control Delay, s/veh	24.4	6.9	9.7
LOS	C	A	A
95th %tile Queue, veh	9	2	2

Intersection			
Intersection Delay, s/veh	9.4		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	360	574	242
Demand Flow Rate, veh/h	367	585	247
Vehicles Circulating, veh/h	221	21	476
Vehicles Exiting, veh/h	501	567	130
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.8	9.6	9.8
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	367	585	247
Cap Entry Lane, veh/h	906	1106	702
Entry HV Adj Factor	0.982	0.981	0.980
Flow Entry, veh/h	360	574	242
Cap Entry, veh/h	889	1085	688
V/C Ratio	0.405	0.529	0.352
Control Delay, s/veh	8.8	9.6	9.8
LOS	A	A	A
95th %tile Queue, veh	2	3	2

Intersection			
Intersection Delay, s/veh	26.3		
Intersection LOS	D		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	711	343	426
Demand Flow Rate, veh/h	725	350	435
Vehicles Circulating, veh/h	391	58	284
Vehicles Exiting, veh/h	328	1058	124
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	44.7	6.8	11.3
Approach LOS	E	A	B
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	725	350	435
Cap Entry Lane, veh/h	764	1066	851
Entry HV Adj Factor	0.981	0.981	0.979
Flow Entry, veh/h	711	343	426
Cap Entry, veh/h	749	1046	833
V/C Ratio	0.949	0.328	0.511
Control Delay, s/veh	44.7	6.8	11.3
LOS	E	A	B
95th %tile Queue, veh	14	1	3

Intersection			
Intersection Delay, s/veh	11.5		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	435	633	304
Demand Flow Rate, veh/h	443	646	310
Vehicles Circulating, veh/h	278	24	541
Vehicles Exiting, veh/h	573	697	129
Follow-Up Headway, s	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	11.4	10.8	12.8
Approach LOS	B	B	B
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Critical Headway, s	5.193	5.193	5.193
Entry Flow, veh/h	443	646	310
Cap Entry Lane, veh/h	856	1103	658
Entry HV Adj Factor	0.981	0.980	0.981
Flow Entry, veh/h	435	633	304
Cap Entry, veh/h	840	1082	645
V/C Ratio	0.518	0.586	0.471
Control Delay, s/veh	11.4	10.8	12.8
LOS	B	B	B
95th %tile Queue, veh	3	4	3

Tierra Contenta Phase 3A

Traffic Impact Analysis

Appendix F

**Synchro 10 Loop Road and Paseo del Sol
Western Intersection**

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	56	109	14	53	118	14	12	5	91	36	5	79
Future Vol, veh/h	56	109	14	53	118	14	12	5	91	36	5	79
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	61	118	15	58	128	15	13	5	99	39	5	86
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	9.5	8.4	8.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	31%	29%	30%
Vol Thru, %	5%	61%	64%	4%
Vol Right, %	84%	8%	8%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	108	179	185	120
LT Vol	12	56	53	36
Through Vol	5	109	118	5
RT Vol	91	14	14	79
Lane Flow Rate	117	195	201	130
Geometry Grp	1	1	1	1
Degree of Util (X)	0.149	0.257	0.265	0.17
Departure Headway (Hd)	4.555	4.764	4.752	4.682
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	782	749	752	762
Service Time	2.613	2.822	2.81	2.74
HCM Lane V/C Ratio	0.15	0.26	0.267	0.171
HCM Control Delay	8.4	9.5	9.5	8.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	1	1.1	0.6

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	62	131	28	56	106	84	87	5	45	18	5	53
Future Vol, veh/h	62	131	28	56	106	84	87	5	45	18	5	53
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	67	142	30	61	115	91	95	5	49	20	5	58
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.2	10.2	9.6	8.7
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	64%	28%	23%	24%
Vol Thru, %	4%	59%	43%	7%
Vol Right, %	33%	13%	34%	70%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	137	221	246	76
LT Vol	87	62	56	18
Through Vol	5	131	106	5
RT Vol	45	28	84	53
Lane Flow Rate	149	240	267	83
Geometry Grp	1	1	1	1
Degree of Util (X)	0.213	0.321	0.345	0.114
Departure Headway (Hd)	5.148	4.811	4.649	4.955
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	689	740	767	715
Service Time	3.233	2.883	2.718	3.049
HCM Lane V/C Ratio	0.216	0.324	0.348	0.116
HCM Control Delay	9.6	10.2	10.2	8.7
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.8	1.4	1.5	0.4

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	64	130	119	55	144	15	152	5	88	38	5	108
Future Vol, veh/h	64	130	119	55	144	15	152	5	88	38	5	108
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	141	129	60	157	16	165	5	96	41	5	117
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14	12.3	13	10.7
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	20%	26%	25%
Vol Thru, %	2%	42%	67%	3%
Vol Right, %	36%	38%	7%	72%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	245	313	214	151
LT Vol	152	64	55	38
Through Vol	5	130	144	5
RT Vol	88	119	15	108
Lane Flow Rate	266	340	233	164
Geometry Grp	1	1	1	1
Degree of Util (X)	0.424	0.51	0.372	0.258
Departure Headway (Hd)	5.727	5.397	5.758	5.656
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	626	663	621	630
Service Time	3.8	3.465	3.835	3.739
HCM Lane V/C Ratio	0.425	0.513	0.375	0.26
HCM Control Delay	13	14	12.3	10.7
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.1	2.9	1.7	1

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	78	172	108	65	126	32	103	5	60	21	5	54
Future Vol, veh/h	78	172	108	65	126	32	103	5	60	21	5	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	85	187	117	71	137	35	112	5	65	23	5	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.5	11.1	10.9	9.4
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	61%	22%	29%	26%
Vol Thru, %	3%	48%	57%	6%
Vol Right, %	36%	30%	14%	68%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	168	358	223	80
LT Vol	103	78	65	21
Through Vol	5	172	126	5
RT Vol	60	108	32	54
Lane Flow Rate	183	389	242	87
Geometry Grp	1	1	1	1
Degree of Util (X)	0.284	0.533	0.352	0.134
Departure Headway (Hd)	5.593	4.928	5.223	5.53
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	641	732	688	647
Service Time	3.634	2.959	3.26	3.578
HCM Lane V/C Ratio	0.285	0.531	0.352	0.134
HCM Control Delay	10.9	13.5	11.1	9.4
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	1.2	3.2	1.6	0.5

Tierra Contenta Phase 3A

Traffic Impact Analysis

Appendix G

Synchro 10 Loop Road and Paseo del Sol Eastern Intersection

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	173	52	99	105	43	81	5	228	99	5	5
Future Vol, veh/h	5	173	52	99	105	43	81	5	228	99	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	188	57	108	114	47	88	5	248	108	5	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	12.1	12.7	13.3	10.8
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %		26%	2%	40%
Vol Thru, %		2%	75%	43%
Vol Right, %		73%	23%	17%
Sign Control		Stop	Stop	Stop
Traffic Vol by Lane		314	230	247
LT Vol		81	5	99
Through Vol		5	173	105
RT Vol		228	52	43
Lane Flow Rate		341	250	268
Geometry Grp		1	1	1
Degree of Util (X)		0.495	0.385	0.419
Departure Headway (Hd)		5.22	5.55	5.619
Convergence, Y/N		Yes	Yes	Yes
Cap		686	645	636
Service Time		3.279	3.615	3.682
HCM Lane V/C Ratio		0.497	0.388	0.421
HCM Control Delay		13.3	12.1	12.7
HCM Lane LOS		B	B	B
HCM 95th-tile Q		2.8	1.8	2.1

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	140	63	167	147	76	44	5	110	50	5	5
Future Vol, veh/h	5	140	63	167	147	76	44	5	110	50	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	152	68	182	160	83	48	5	120	54	5	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	14.5	10.2	9.8
HCM LOS	B	B	B	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1	
Vol Left, %		28%	2%	43%	83%
Vol Thru, %		3%	67%	38%	8%
Vol Right, %		69%	30%	19%	8%
Sign Control		Stop	Stop	Stop	Stop
Traffic Vol by Lane		159	208	390	60
LT Vol		44	5	167	50
Through Vol		5	140	147	5
RT Vol		110	63	76	5
Lane Flow Rate		173	226	424	65
Geometry Grp		1	1	1	1
Degree of Util (X)		0.255	0.314	0.579	0.109
Departure Headway (Hd)		5.308	5.006	4.917	5.99
Convergence, Y/N		Yes	Yes	Yes	Yes
Cap		676	717	738	597
Service Time		3.346	3.039	2.917	4.034
HCM Lane V/C Ratio		0.256	0.315	0.575	0.109
HCM Control Delay		10.2	10.3	14.5	9.8
HCM Lane LOS		B	B	B	A
HCM 95th-tile Q		1	1.3	3.8	0.4

Intersection	
Intersection Delay, s/veh	15.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	198	58	106	124	44	91	5	258	111	5	5
Future Vol, veh/h	5	198	58	106	124	44	91	5	258	111	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	215	63	115	135	48	99	5	280	121	5	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	14.3	15.1	16.8	11.9
HCM LOS	B	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	2%	39%	92%
Vol Thru, %	1%	76%	45%	4%
Vol Right, %	73%	22%	16%	4%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	354	261	274	121
LT Vol	91	5	106	111
Through Vol	5	198	124	5
RT Vol	258	58	44	5
Lane Flow Rate	385	284	298	132
Geometry Grp	1	1	1	1
Degree of Util (X)	0.602	0.471	0.503	0.244
Departure Headway (Hd)	5.631	5.983	6.077	6.678
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	643	601	593	537
Service Time	3.649	4.035	4.105	4.737
HCM Lane V/C Ratio	0.599	0.473	0.503	0.246
HCM Control Delay	16.8	14.3	15.1	11.9
HCM Lane LOS	C	B	C	B
HCM 95th-tile Q	4	2.5	2.8	1

Intersection	
Intersection Delay, s/veh	13.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	173	80	188	172	44	52	5	134	60	5	5
Future Vol, veh/h	5	173	80	188	172	44	52	5	134	60	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	188	87	204	187	48	57	5	146	65	5	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	11.9	17	11.3	10.4
HCM LOS	B	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	2%	47%	86%
Vol Thru, %	3%	67%	43%	7%
Vol Right, %	70%	31%	11%	7%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	191	258	404	70
LT Vol	52	5	188	60
Through Vol	5	173	172	5
RT Vol	134	80	44	5
Lane Flow Rate	208	280	439	76
Geometry Grp	1	1	1	1
Degree of Util (X)	0.322	0.409	0.637	0.134
Departure Headway (Hd)	5.581	5.248	5.223	6.361
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	642	684	689	561
Service Time	3.638	3.297	3.265	4.432
HCM Lane V/C Ratio	0.324	0.409	0.637	0.135
HCM Control Delay	11.3	11.9	17	10.4
HCM Lane LOS	B	B	C	B
HCM 95th-tile Q	1.4	2	4.6	0.5

Tierra Contenta Phase 3A

Traffic Impact Analysis - Addendum

May 30, 2023

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APPENDIXES

Appendix A – Trip Generations

Appendix B - Synchro 10 Western Intersection Jaguar Drive & Paseo del Sol

Appendix C- Synchro 10 Eastern Intersection Jaguar Drive & Paseo del Sol

Appendix D- Synchro 10 Herrera Drive and Paseo del Sol

Appendix D- Synchro 10 Western Loop Road and Paseo del Sol

Appendix D- Synchro 10 Eastern Loop Road and Paseo del Sol

Appendix G – Original TIA

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

EXECUTIVE SUMMARY

The subject of this traffic study is the area within the boundaries of a proposed amended master plan for Phase 3A of the Tierra Contenta, a PUD within the City of Santa Fe located on the south side of the first two phases of the Tierra Contenta PUD. This report addressed the impact of the proposed revised land use plan for Tierra Contenta Phase 3A on the surrounding City of Santa Fe roadway system.

This addendum was to address the increase in residential units from 1175 to 1500. A revised buildout year of 2033 and a horizon year of 2043 were used in the analysis. Based upon the results of this traffic study, the required improvements on within the studied area are the following:

- Stop Controlled Intersection of West Paseo del Sol and Jaguar Drive
 - 1) In the build out year 2033 (Phase 2), no improvements are needed
 - 2) In the horizon year 2043, a right turn lane for Jaguar Drive eastbound may be required. A traffic study should be conducted at that time to determine if the right turn lane is needed.
- Signalized Intersection of East Paseo del Sol and Jaguar Drive
No improvements are required for Year 2033 and Year 2043
- Roundabout Intersection of Paseo del Sol and Herrera Drive
No improvements are required for Year 2033 and Year 2043
- Internal Phase 3A Intersection
Both major internal road intersections will require roundabout for both the design year 2033 and the horizon year 2043.

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

I. SCOPE OF ADDENDUM

A Traffic Impact Analysis (TIA) was previously prepared for Phase 3A of Tierra Contenta. This Addendum is to determine the impact of increasing the number of residential units from 1175 to 1500 units. The school and commercial development will remain the same as the original study.

Figure 1 is a vicinity map describing the location of this property. Figure 2 describes the site development plans and parcel development plan with Parcel Number and residential units' count.

II CHANGE IN PROPOSED DEVELOPMENT

A. Land Use per Parcel

As noted before, this development will be a plan unit development. The increase of units from 1175 to 1,500 residential units per parcel is summarized below in Table 1.

Table 1: Phase 3A Tierra Contenta Land Use

Parcel Number	Land Use	Type	Original Number of Residential Units	Revised Number of Residential Units
57	Single Family	Detached	49	63
58	Live/Work	Attached	21	27
59	Live/Work	Attached	21	27
60	Single Family	Detached	60	77
61	Single Family	Detached	73	93
62	Single Family	Detached	107	137
63	Multifamily	Apartments	275	351
64	Single Family	Townhouse	225	287
65	Multifamily	Apartments	150	191
67	Single Family	Detached	40	51
68	Single Family	Detached	12	15
69	Single Family	Detached	85	109
75	Single Family	Detached	11	14
76	Single Family	Detached	12	15
77	Single Family	Townhouse	34	43
	Total		1175	1500

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

B. Location and Type of Access Points

For this mix use development, Paseo del Sol will be extended from the western intersection of Jaguar Drive to the eastern intersection of Herrera Drive. For the internal Phase 3A traffic, a loop road will be built that has two intersection onto Paseo Del Sol. This loop road is label as having an eastern and western intersection. Refer to Figure 2 for the roadway layout. Within Phase 3A, Paseo del Sol will be two lane roadway with bike lanes.

III EXISTING TRAFFIC VOLUMES

Traffic counts were taken using a JAMAR DB-100 unit. For the original TIA, traffic counts for the all the intersections were taken in 2020. Due to the COVID issues, NMDOT will allow the use of traffic counts taken previously. No new counts were taken for the Addendum.

IV. DESIGN YEAR AND HORIZON YEAR BACKGROUND TRAFFIC

Since the original study had existing traffic counts for 2020 and used a design year of 2030 and horizon year 2040, there were 10 years and 20 years of increase in traffic volume, respectively. This report will be using the same increase in traffic but starting in 2023. Therefore, the design year with background and site traffic will be 2023 (Figures 5 and 6 in original study) and the horizon year 2043 (Figures 8 and 9 in original study).

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

V. CHANGE IN TRAFFIC VOLUMES

Table 2 was created to determine the net increase in volume of trips with the increase in residential units. The table shows the trips for the original 1175 residential units, trips for the proposed 1500 residential units and the trip increase between the 1175 and the 1500 units. The trip generation work sheets are shown in Appendix A.

The original traffic study used the Santa Fe Municipal Planning Organization (SFMPO) VISUM traffic model to distribute generated traffic volumes onto the studied intersections. This model was described in detail in the original study.

Using the original model as a basis of traffic distribution, the increase in residential traffic volumes per table 2 were assigned to the studied intersections. Refer to Figure 3 for traffic distribution within Phase 3A development internal loop roads and Figure 4 for traffic distribution on the studied intersection.

From the original study, the increase in background traffic for the design years and the VISUM traffic distribution for the 1175 residential units were used as the basis for the intersection volumes. The additional traffic distribution from Figures 3 and 4 were added to the original intersection volumes to create the increase traffic to be studied. This increase is shown Figures 5 and 7 for the internal loop road intersections and Figures 6 and 8 for the studied offsite intersections.

Table 2 Tierra Contenta Phase 3A Trip Distribution
Increase From 1135 to 1500 Residential Units

Tract	Land Use	Original Trip Generation				Update Trip Generation				Increase in Trips			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
South West Section													
57	Single Family	10	27	31	18	12	36	40	23	2	9	9	5
59	Mixed Use	3	4	6	3	4	5	8	4	1	1	2	1
60	Single Family	12	34	38	22	15	44	49	28	3	10	11	6
64	Single Family	35	91	89	62	45	116	113	79	10	25	24	17
										16	45	46	29
North West Section													
58	Mixed Use	3	4	6	3	4	5	8	4	1	1	2	1
65	Multifamily	13	35	37	24	16	45	47	31	3	10	10	7
75	Single Family	2	6	7	4	3	8	9	5	1	2	2	1
76	Single Family	2	7	8	4	3	8	10	5	1	1	2	1
77	Single Family	5	14	14	9	7	17	17	12	2	3	3	3
										8	17	19	13
South East Section													
61	Single Family	14	41	47	26	18	53	60	33	4	12	13	7
62	Single Family	21	60	68	39	27	77	88	49	6	17	20	10
63	Multifamily	24	64	68	45	30	82	86	58	6	18	18	13
										16	47	51	30
North East Section													
67	Single Family	8	22	26	14	10	29	33	18	2	7	7	4
68	Single Family	2	7	8	4	3	8	10	5	1	1	2	1
69	Single Family	17	48	54	31	22	61	70	39	5	13	16	8
										8	21	25	13
Total Increase:										48	130	141	85

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

VI. TRAFFIC EVALUATION

A. Level of Service

Synchro 10 software was used to determine the operational level of service (LOS) for the intersection. The LOS is conducted for the design years 2033 and 2043. First, LOS were determined for fully developed conditions for both years. If a LOS with failing conditions were identified, then LOS for undeveloped condition was run to determine what improvements will be required to improve the LOS.

LOS is ranked from A-F, with A being the highest level of service with the least delays and F indicating a break-down in the operation of the intersection. Table 2 summarizes the delays associated with LOS rankings for both an unsignalized intersection and a signalized intersection.

Table 3 LOS Rankings

LOS	Unsignalized Intersection	Signalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

B. Existing Western Intersection of Jaguar Drive and Paseo del Sol

The western intersection of Jaguar Drive and Paseo del Sol is an unsignalized with stop conditions on all four approaches. The traffic volumes and distributions were taken from Figure 6 for Year 2033 and from Figure 8 for Year 2043. The Synchro 10 results are summarized below on Table 4. The analysis reports are attached in Appendix C.

TABLE 4: Jaguar Drive and Paseo del Sol West LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 6 Year 2033		Figure 8 Year 2043	
Movement	AM	PM	AM	PM
Paseo Del Sol SB	B/14.3	C/15.5	C/17.1	C/17.2
Paseo Del Sol NB	C/15.3	B/14.5	C/21.0	C/17.0
Jaguar Drive EB	B/14.5	C/21.5	C/18.7	E/37.6
Jaguar Drive WB	B/12.8	B/14.4	C/16.0	C/17.3

The LOS is acceptable for all approaches for both buildout year 2033 and horizon year 2043.

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C. Existing Eastern Intersection of Jaguar Drive and Paseo del Sol

The eastern intersection of Jaguar Drive and Paseo del Sol is a signalized with protected left turns on all four approaches. The traffic volumes and distributions were taken from Figure 6 for Year 2033 and from Figure 8 for Year 2043. The Synchro 10 results are summarized below on Table 6. The analysis reports are attached in Appendix D.

TABLE 6: Jaguar Drive and Paseo del Sol East LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 6 Year 2033		Figure 8 Year 2043	
Movement	AM	PM	AM	PM
Paseo Del Sol SB	C/25.5	B/17.9	C/29.4	C/20.8
Paseo Del Sol NB	C/22.7	B/13.2	C/29.2	B/16.0
Jaguar Drive EB	C/29.0	C/27.2	C/30.1	C/32.7
Jaguar Drive WB	C/20.4	B/18.4	B/19.6	B/18.3

The LOS is acceptable for all approaches for both buildout year 2033 and horizon year 2043.

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

D. Existing Intersection of Herrera Drive and Paseo del Sol East

The intersection of Herrera Drive and Paseo del Sol is an unsignalized roundabout with three approaches. The traffic volumes and distributions were taken from Figure 6 for Year 2033 and from Figure 8 for Year 2043. The Synchro 10 results are summarized below on Table 7. The analysis reports are attached in Appendix E.

TABLE 7: Herrera Drive and Paseo del Sol East LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 6 Year 2033		Figure 8 Year 2043	
Movement	AM	PM	AM	PM
Herrera Drive EB	C/17.9	A/7.2	D/29.1	A/8.7
Herrera Drive WB	A/5.6	A/7.6	A/5.4	B/11.0
Paseo Del Sol SB	A/7.5	A/8.6	A/8.6	A/9.1

The LOS is acceptable for all approaches for both buildout year 2033 and horizon year 2043.

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

E. Western Loop Road and Paseo del Sol (Internal Intersection)

The intersection of Western Loop Road and Paseo del Sol is a new intersection within the proposed Phase 3A development. The intersection was assumed to be roundabout condition. The traffic volumes and distributions were taken from Figure 5 for Year 2033 and from Figure 7 for Year 2043. The Synchro 10 results are summarized below on Table 8. The analysis reports are attached in Appendix F.

TABLE 8 Western Loop Road and Paseo del Sol ROUNDABOUT INTERSECTION LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 5 Year 2033		Figure 7 Year 2043	
Movement	AM	PM	AM	PM
Paseo Del Sol EB	A/5.5	A/5.7	A/5.9	A/6.7
Paseo Del Sol WB	A/5.3	A/5.3	A/5.9	A/6.0
South Loop NB	A/6.0	A/5.7	A/6.6	A/6.0
North Loop SB	A/5.5	A/4.6	A/6.3	A/5.0

The LOS is acceptable for all approaches for both buildout year 2033 and horizon year 2043.

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Traffic Impact Analysis Addendum

F. Eastern Loop Road and Paseo del Sol

The intersection of Eastern Loop Road and Paseo del Sol is a new intersection within the proposed Phase 3A development. This intersection was assumed to be four way stop condition. The traffic volumes and distributions were taken from Figure 5 for Year 2033 and from Figure 7 for Year 2043. The Synchro 10 results are summarized below on Table 9. The analysis report is attached in Appendix G.

TABLE 9 Eastern Loop Road and Paseo del Sol ROUNDABOUT INTERSECTION LEVEL OF SERVICE ANALYSIS/DELAY (Seconds)				
	Figure 5 Year 2033		Figure 7 Year 2043	
Movement	AM	PM	AM	PM
Paseo Del Sol EB	A/6.1	A/6.2	A/6.7	A/7.2
Paseo Del Sol WB	A/5.2	A/6.9	A/5.5	A/7.6
South Loop NB	A/8.6	A/5.2	A/9.8	A/5.9
North Loop SB	A/5.2	A/5.2	A/5.6	A/5.8

The LOS is acceptable for all approaches for both buildout year 2033 and horizon year 2043.

Tierra Contenta Phase 3A Traffic Impact Analysis Addendum

VII. SUMMARY AND RECOMMENDATIONS

A. Summary

Tierra Contenta Phase 3A will have minimal impact on the City of Santa Fe road system. The required improvements have been identified and will be implemented as the subdivision is developed.

B. Recommendations

Based on this traffic impact analysis study, the following recommended improvements should be made with the Tierra Contenta Phase 3A:

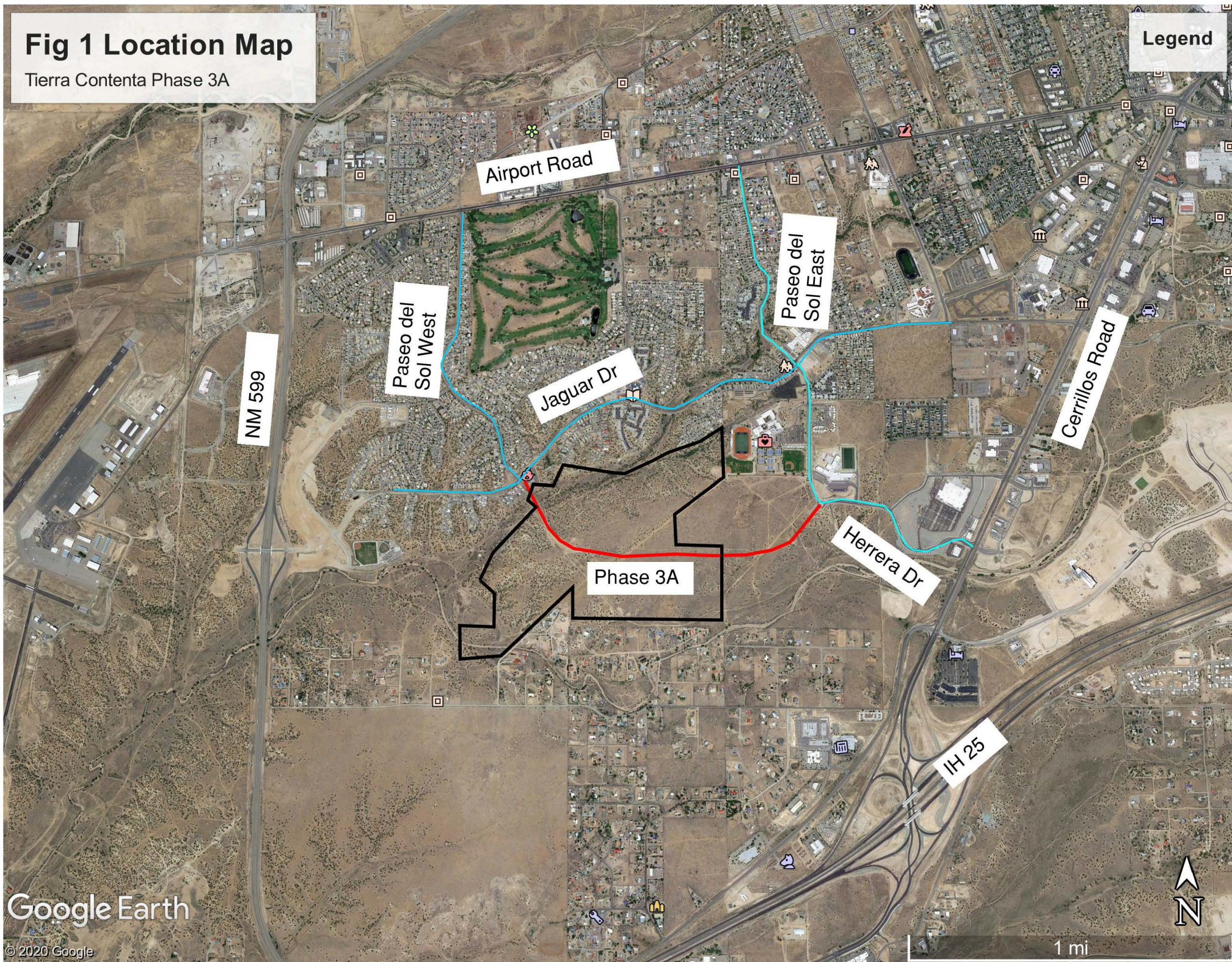
- Stop Controlled Intersection of West Paseo del Sol and Jaguar Drive
 - 1) In the build out year 2033, no improvements are needed
 - 2) In the horizon year 2043, a right turn lane for Jaguar Drive eastbound could be required. A new study should be preformed at that time
- Signalized Intersection of East Paseo del Sol and Jaguar Drive
No improvements are required for Year 2033 and Year 2043
- Roundabout Intersection of Paseo del Sol and Herrera Drive

No improvements are required for Year 2033 and Year 2043
- Internal Phase 3A Intersection
Both major internal road intersections will require roundabout for both design year 2033 and horizon year 2043

Fig 1 Location Map

Tierra Contenta Phase 3A

Legend


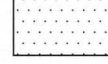




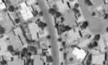


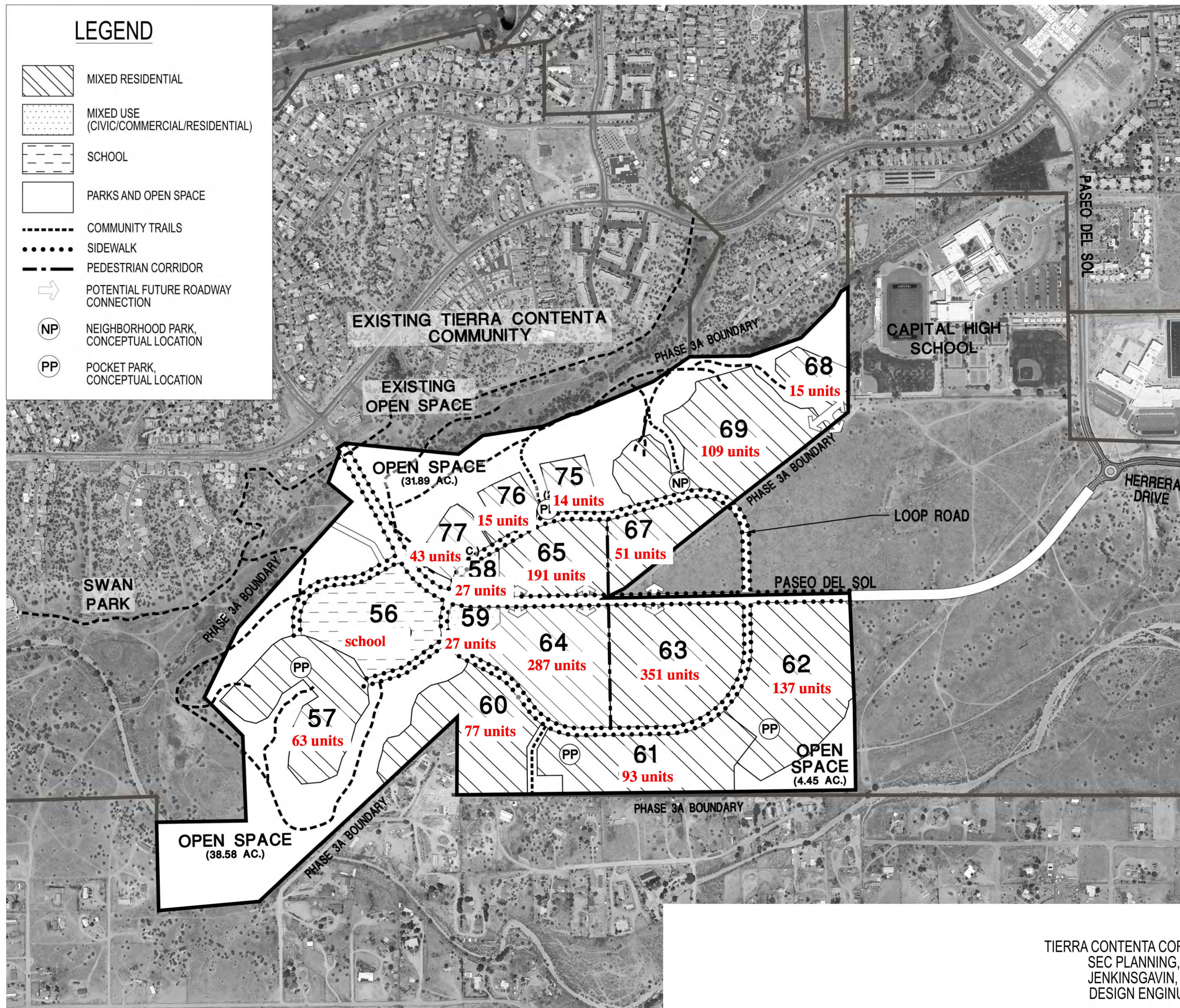
Google Earth

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LEGEND

-  MIXED RESIDENTIAL
-  MIXED USE (CIVIC/COMMERCIAL/RESIDENTIAL)
-  SCHOOL
-  PARKS AND OPEN SPACE
-  COMMUNITY TRAILS
-  SIDEWALK
-  PEDESTRIAN CORRIDOR
-  POTENTIAL FUTURE ROADWAY CONNECTION
-  NEIGHBORHOOD PARK, CONCEPTUAL LOCATION
-  POCKET PARK, CONCEPTUAL LOCATION

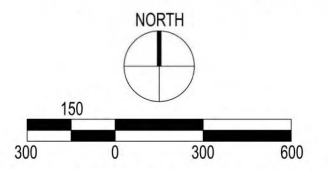


NOTES:

1. FOR DEVELOPMENT PROGRAM, SEE ABOVE. SEE ALSO RESTATED ANNEXATION AGREEMENT ENTITLED "TIERRA CONTENTA, WOLMAGOOD SUBDIVISION AND CONTIGUOUS LAND (EAST)" FOR CONDITIONS OF DEVELOPMENT.
2. AT THE TIME OF APPLICATION FOR PLAT, A SYSTEM OF APPROPRIATELY SCALED LOCAL ROADS SHALL BE ESTABLISHED WHICH CONNECT OR ARE STUBBED OUT TO PERMIT LATER CONNECTION TO ADJOINING LOCAL ROADS ON PROPERTIES WITHIN OR NEXT TO TIERRA CONTENTA.
3. SUBSEQUENT PLATS SHALL ILLUSTRATE STORM WATER MANAGEMENT SYSTEMS ACCEPTABLE TO THE CITY WHICH INCLUDE FACILITY DESIGN AND MAINTENANCE PROGRAMS.
4. FOR FINAL SUBDIVISION PLATS OR DEVELOPMENT PLANS (IN THE CASE OF MULTI-FAMILY), THE DISPOSITION OF LANDS OVER 30% SLOPE THAT ARE NOT LOCATED IN THE PUBLIC OPEN SPACE SYSTEM SHALL BE CLARIFIED. LANDS OUTSIDE THE OPEN SPACE SYSTEM THAT ARE OVER 30% SLOPE SHALL BE IDENTIFIED AS REMAINING UNDISTURBED PER THE CITY CODE OR AS REQUIRING A VARIANCE.
5. SUBMITTALS SHALL BE PREPARED ON A TRACT BY TRACT BASIS FOR IMPROVEMENT PLANS, VEGETATION PLANS (INCLUDING USE OF NATIVE PLANTS) AND IRRIGATION PLANS (INCLUDING XERISCAPE AND USE OF EFFLUENT WATER) IN PARKS, OPEN SPACE, ROADWAYS, DRAINAGES, AND COMMUNITY FACILITIES. THE CITY PARKS AND PUBLIC WORKS DEPARTMENTS SHALL REVIEW THE SUBMITTALS TO DETERMINE ACCEPTABLE PLANS.
6. THE CITY PARKS DEPARTMENT SHALL RECOMMEND SIZE AND DEVELOPMENT CRITERIA FOR PARK IMPROVEMENTS.
7. ROADS WILL BE CONSTRUCTED CONSISTENT WITH CITY CODE OR VARIANCES FROM THE CITY CODE SHALL BE OBTAINED.
8. DEVELOPMENT WITH THE PRC SHALL COMPLY WITH THE APPROVED DESIGN GUIDELINES.

PHASE 3A DEVELOPMENT AND TRACT DATA				
TRACT	LAND USE	NET ACREAGE	UNITS	DU/ACRE
56	SCHOOL	10.25	0	0.0
57	MIXED RESIDENTIAL	10.69	49	4.6
58	MIXED USE (CIVIC/COMMERCIAL/RESIDENTIAL)	1.38	21	12.0
59	MIXED USE (CIVIC/COMMERCIAL/RESIDENTIAL)	1.68	21	12.5
60	MIXED RESIDENTIAL	11.77	60	5.1
61	MIXED RESIDENTIAL	11.97	73	6.1
62	MIXED RESIDENTIAL	16.05	107	6.7
63	MIXED RESIDENTIAL	14.88	275	18.5
64	MIXED RESIDENTIAL	12.23	225	18.4
65	MIXED RESIDENTIAL	7.36	150	17.2
67	MIXED RESIDENTIAL	5.68	40	7.0
68	MIXED RESIDENTIAL	2.77	12	4.3
69	MIXED RESIDENTIAL	16.02	85	5.3
75	MIXED RESIDENTIAL	2.52	11	4.4
76	MIXED RESIDENTIAL	2.70	12	4.4
77	MIXED RESIDENTIAL	2.92	34	11.6
	OPEN SPACE	85.65	0	0.0
PHASE 3A TOTALS		216.52	1175	5.3
MAXIMUM PERMISSIBLE UNITS			1500	6.7

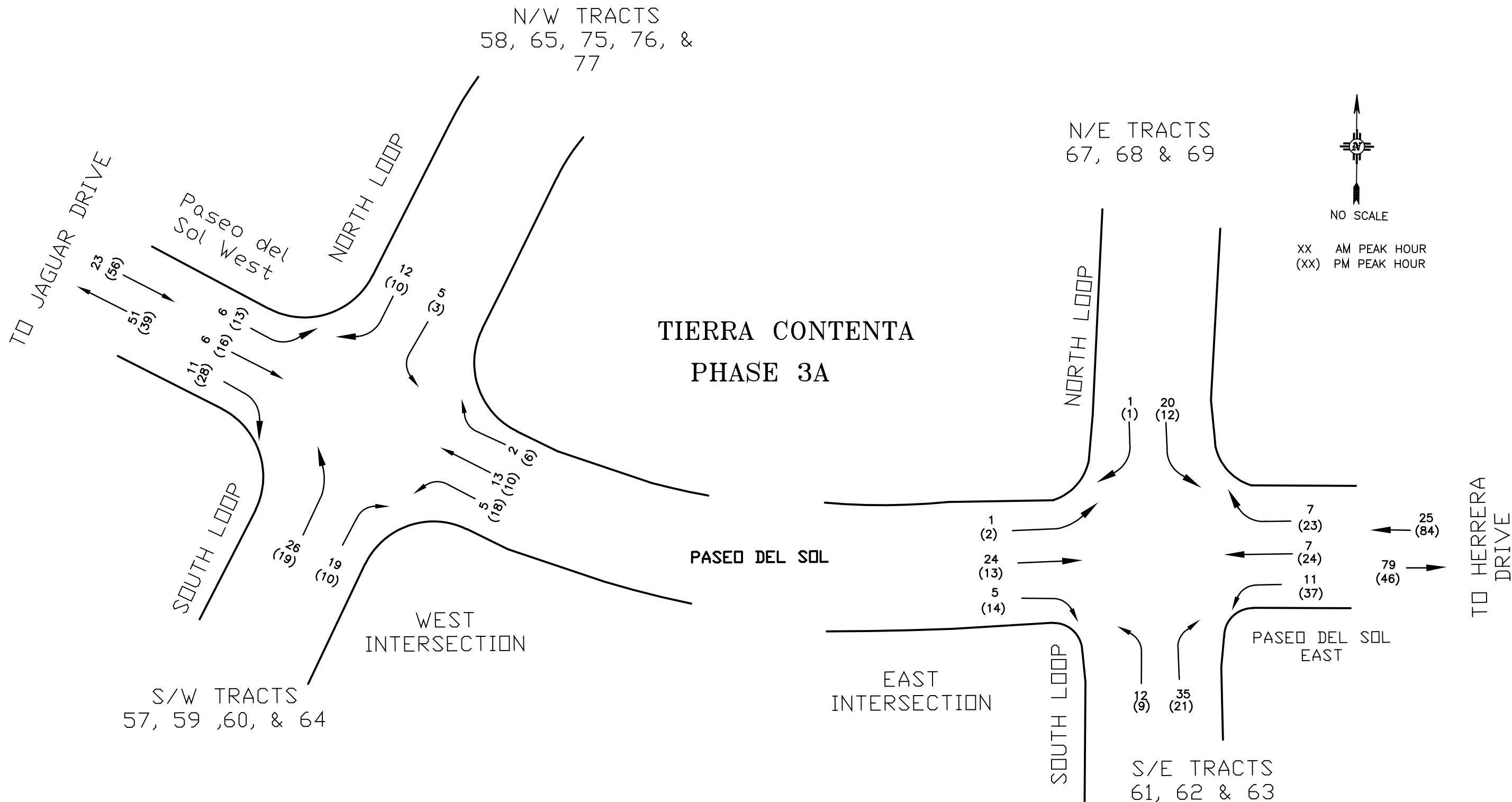
MASTER PLAN AMENDMENT #1



TIERRA CONTENTA PHASE 3A SANTA FE, NEW MEXICO

FIGURE 2
SITE PLAN

TIERRA CONTENTA CORPORATION
SEC PLANNING, LLC
JENKINS GAVIN, INC.
DESIGN ENGINEUTY

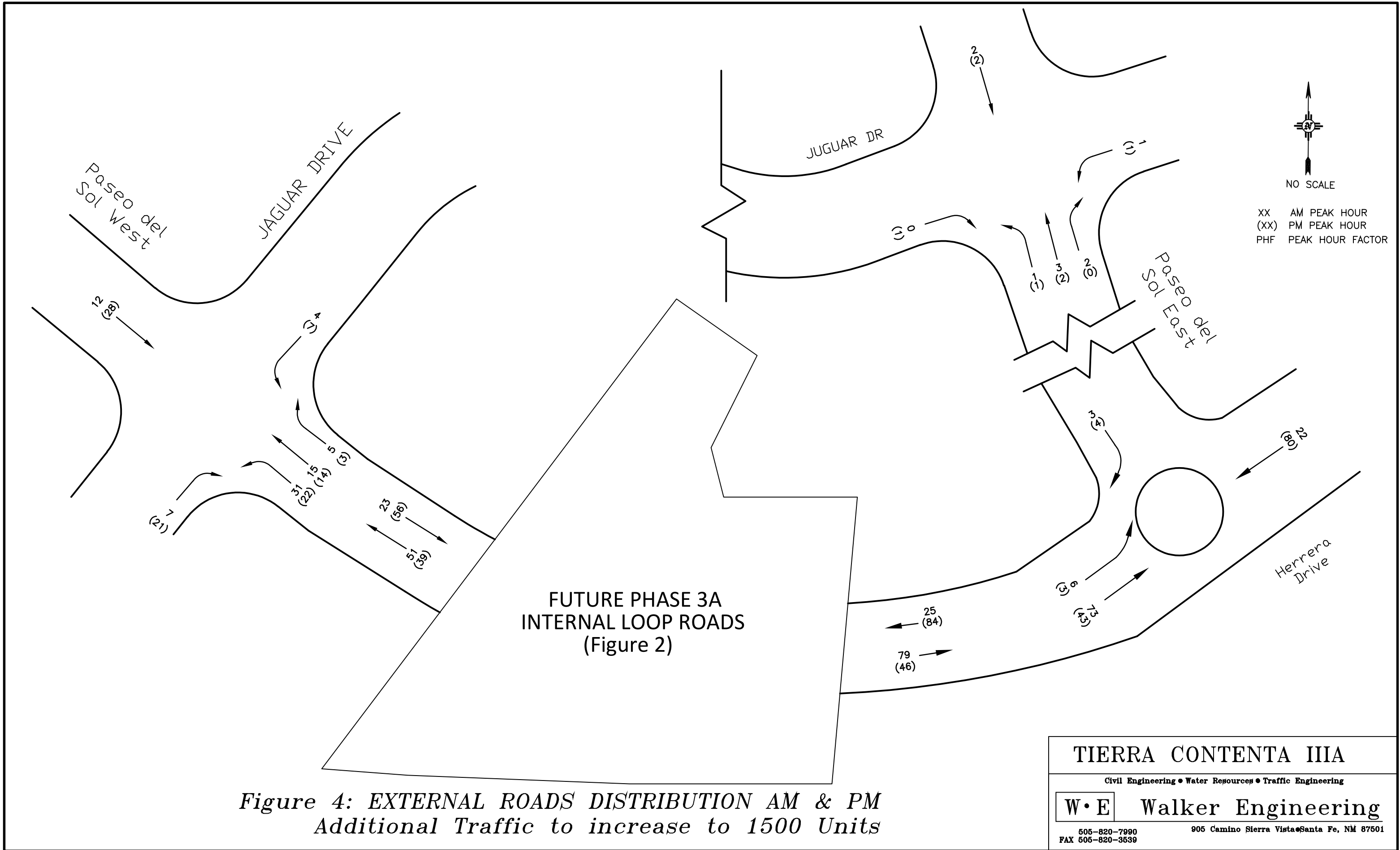


*Figure 3: INTERNAL LOOP ROADS AM & PM
 Additional Traffic to Increase to 1500 Units*

TIERRA CONTENTA IIIA
 Civil Engineering • Water Resources • Traffic Engineering

W•E Walker Engineering

505-820-7990 905 Camino Sierra Vista • Santa Fe, NM 87501
 FAX 505-820-3539



*Figure 4: EXTERNAL ROADS DISTRIBUTION AM & PM
Additional Traffic to increase to 1500 Units*

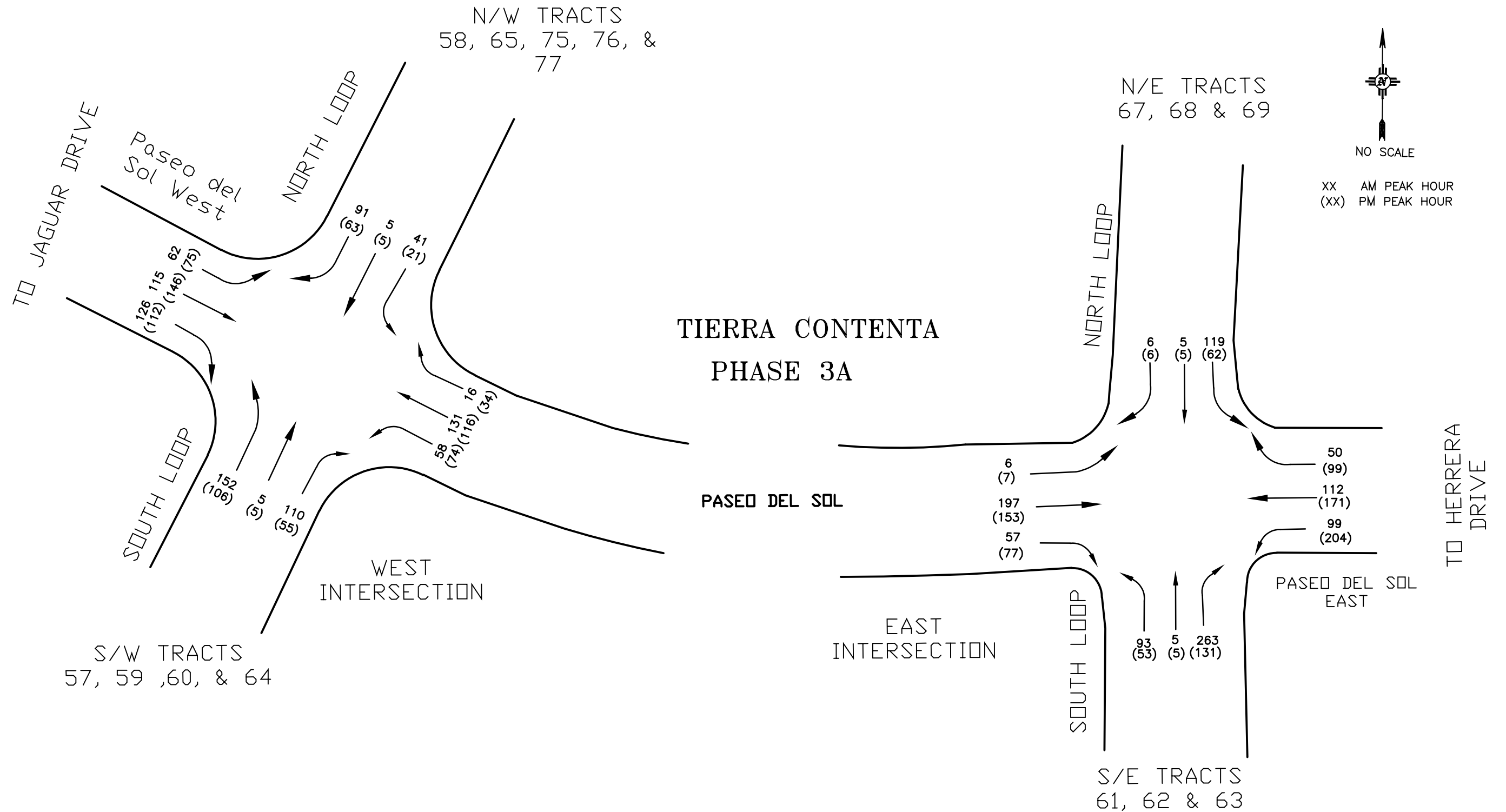


Figure 5: 2033 INTERNAL LOOP ROADS AM & PM
Total 1500 Residential Units

TIERRA CONTENTA IIIA

Civil Engineering • Water Resources • Traffic Engineering

W•E Walker Engineering

505-820-7990
FAX 505-820-3539

905 Camino Sierra Vista • Santa Fe, NM 87501

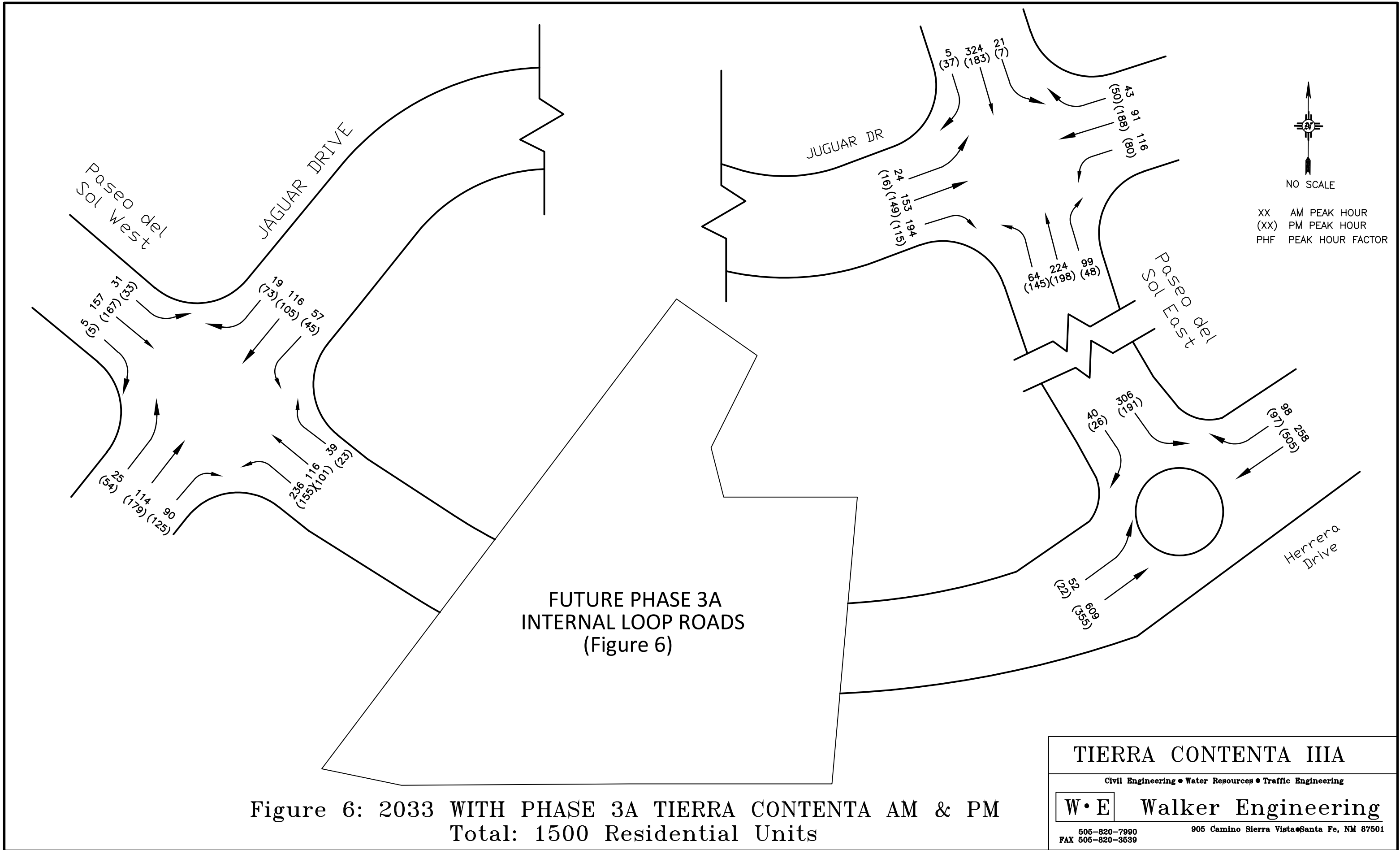


Figure 6: 2033 WITH PHASE 3A TIERRA CONTENTA AM & PM
 Total: 1500 Residential Units

TIERRA CONTENTA IIIA

Civil Engineering • Water Resources • Traffic Engineering

W•E Walker Engineering

505-820-7990
 FAX 505-820-3539

905 Camino Sierra Vista • Santa Fe, NM 87501

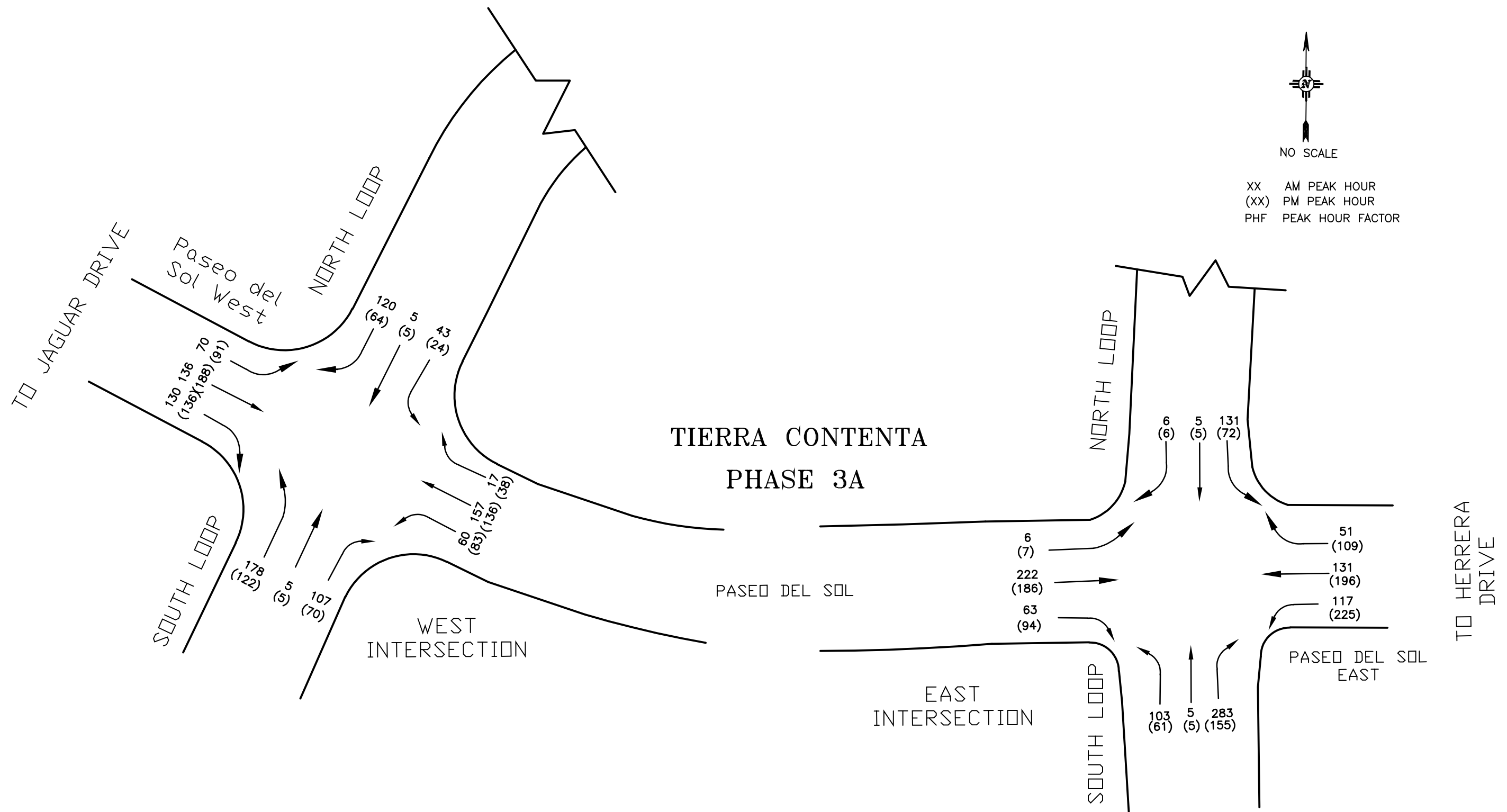


Figure 7: 2043 INTERNAL LOOP ROADS AM & PM
 Total: 1500 Residential Units

TIERRA CONTENTA IIIA
 Civil Engineering • Water Resources • Traffic Engineering

W•E Walker Engineering

505-820-7990 905 Camino Sierra Vista • Santa Fe, NM 87501
 FAX 505-820-3539

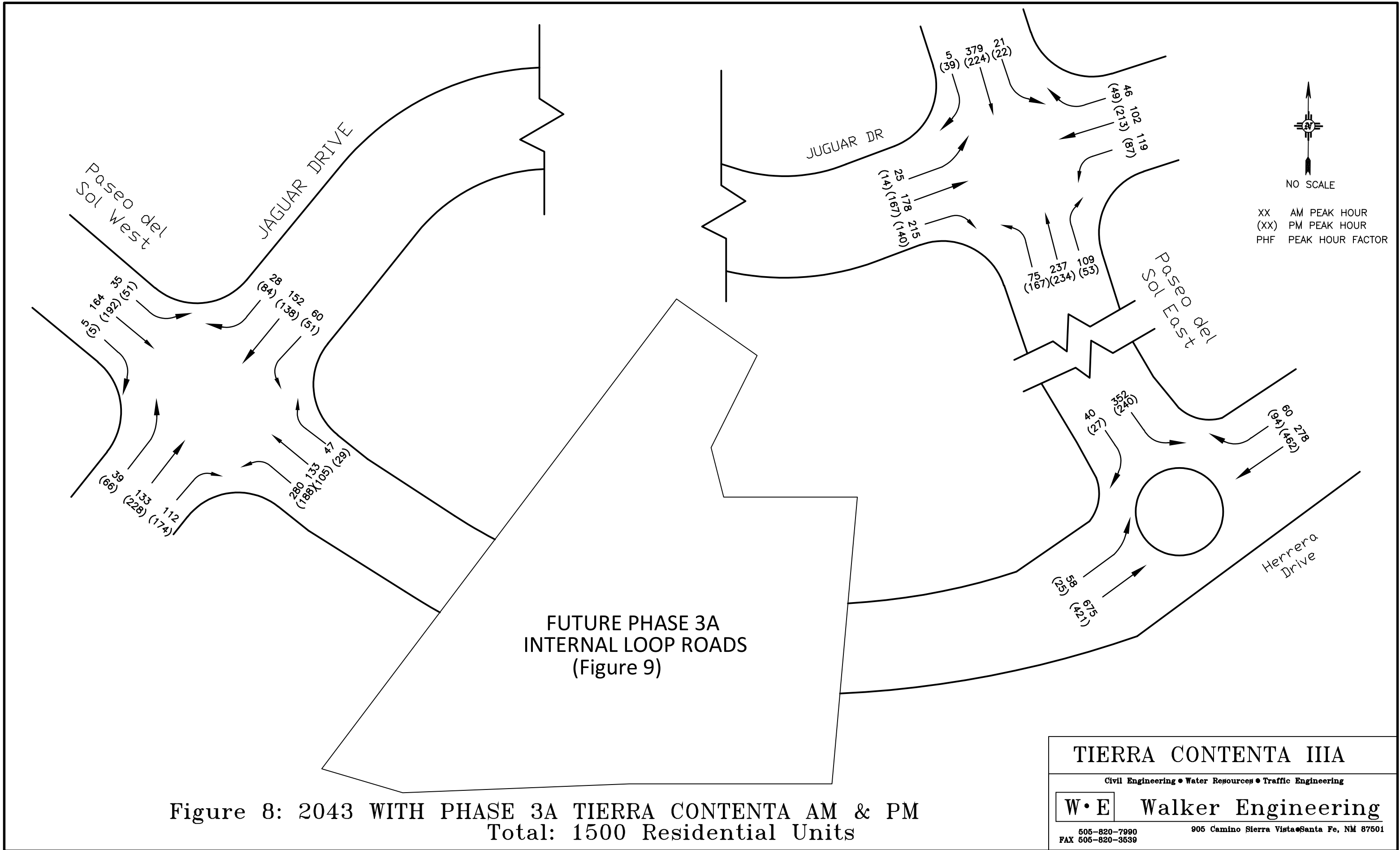


Figure 8: 2043 WITH PHASE 3A TIERRA CONTENTA AM & PM
Total: 1500 Residential Units

Tierra Contenta Phase 3A
Traffic Addendum

Appendix A
Trip Generations

Trip Generation Summary

North Section with Original Units

Alternative: Alternative 1
 Phase:
 Project: Tierra Contenta

Open Date: 2/14/2023
 Analysis Date: 2/14/2023

ITE	Land Use	Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Weekday					
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 5 40 Dwelling Units <i>Tract 67</i>		8	22	30		26	14	40		189	189	378
210	SFHOUSE 4 12 Dwelling Units <i>Tract 76</i>		2	7	9		8	4	12		57	56	113
210	SFHOUSE 3 85 Dwelling Units <i>Tract 69</i>		17	48	65		54	31	85		401	401	802
210	SFHOUSE 2 11 Dwelling Units <i>Tract 75</i>		2	6	8		7	4	11		52	52	104
210	SFHOUSE 1 12 Dwelling Units <i>Tract 68</i>		2	7	9		8	4	12		57	56	113
220	LOW-RISE 1 34 Dwelling Units <i>Tract 77</i>		5	14	19		14	9	23		125	124	249
221	MID-RISE 1 150 Dwelling Units <i>Tract 65</i>		13	35	48		37	24	61		408	408	816
231	MID-RISE-COMM 1 21 Dwelling Units <i>Tract 58</i>		3	4	7		6	3	9		36	36	72
Unadjusted Volume			52	143	195		160	93	253		1325	1322	2647
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			52	143	195		160	93	253		1325	1322	2647

Total Weekday AM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday PM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Trip Generation Summary

North Section with Increase Units

Alternative: Alternative 1
 Phase:
 Project: Tierra Contenta 3A

Open Date: 2/14/2023
 Analysis Date: 2/14/2023

ITE	Land Use	Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Weekday					
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 5 51 Dwelling Units <i>Tract 67</i>		10	29	39		33	18	51		241	240	481
210	SFHOUSE 4 15 Dwelling Units <i>Tract 68</i>		3	8	11		10	5	15		71	71	142
210	SFHOUSE 3 109 Dwelling Units <i>Tract 69</i>		22	61	83		70	39	109		515	514	1029
210	SFHOUSE 2 14 Dwelling Units <i>Tract 75</i>		3	8	11		9	5	14		66	66	132
210	SFHOUSE 1 15 Dwelling Units <i>Tract 76</i>		3	8	11		10	5	15		71	71	142
220	LOW-RISE 1 43 Dwelling Units <i>Tract 77</i>		7	17	24		17	12	29		158	157	315
221	MID-RISE 1 191 Dwelling Units <i>Tract 65</i>		16	45	61		47	31	78		520	519	1039
231	MID-RISE-COMM 1 27 Dwelling Units <i>Tract 58</i>		4	5	9		8	4	12		47	46	93
Unadjusted Volume			68	181	249		204	119	323		1689	1684	3373
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			68	181	249		204	119	323		1689	1684	3373

Total Weekday AM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday PM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Trip Generation Summary

South Section with Original Units

Alternative: Alternative 1
 Phase:
 Project: Tierra Contenta 3A

Open Date: 2/14/2023
 Analysis Date: 2/14/2023

ITE	Land Use	Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Weekday					
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 4 49 Dwelling Units		10	27	37		31	18	49		232	231	463
	<i>Tract 57</i>												
210	SFHOUSE 3 60 Dwelling Units		12	34	46		38	22	60		283	283	566
	<i>Tract 60</i>												
210	SFHOUSE 2 73 Dwelling Units		14	41	55		47	26	73		345	344	689
	<i>Tract 61</i>												
210	SFHOUSE 1 107 Dwelling Units		21	60	81		68	39	107		505	505	1010
	<i>Tract 62</i>												
220	LOW-RISE 1 225 Dwelling Units		35	91	126		89	62	151		824	823	1647
	<i>Tract 64</i>												
221	MID-RISE 1 275 Dwelling Units		24	64	88		68	45	113		748	748	1496
	<i>Tract 63</i>												
231	MID-RISE-COMM 1 21 Dwelling Units		3	4	7		6	3	9		36	36	72
	<i>Tract 59</i>												
Unadjusted Volume			119	321	440		347	215	562		2973	2970	5943
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			119	321	440		347	215	562		2973	2970	5943

Total Weekday AM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday PM Peak Hour of Generator Internal Capture = 0 Percent
 Total Weekday Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Trip Generation Summary

South Section with Increase Units

Alternative: Alternative 1

Phase:

Project: Tierra Contenta 3A

Open Date: 2/14/2023

Analysis Date: 2/14/2023

ITE	Land Use	Weekday AM Peak Hour of Generator			Weekday PM Peak Hour of Generator			Weekday					
		*	Enter	Exit	Total	*	Enter	Exit	Total	*	Enter	Exit	Total
210	SFHOUSE 4 63 Dwelling Units <i>Tract 57</i>		12	36	48		40	23	63		298	297	595
210	SFHOUSE 3 77 Dwelling Units <i>Tract 60</i>		15	44	59		49	28	77		364	363	727
210	SFHOUSE 2 93 Dwelling Units <i>Tract 61</i>		18	53	71		60	33	93		439	439	878
210	SFHOUSE 1 137 Dwelling Units <i>Tract 62</i>		27	77	104		88	49	137		647	646	1293
220	LOW-RISE 1 287 Dwelling Units <i>Tract 64</i>		45	116	161		113	79	192		1051	1050	2101
221	MID-RISE 1 351 Dwelling Units <i>Tract 63</i>		30	82	112		86	58	144		955	954	1909
231	MID-RISE-COMM 1 27 Dwelling Units <i>Tract 59</i>		4	5	9		8	4	12		47	46	93
Unadjusted Volume			151	413	564		444	274	718		3801	3795	7596
Internal Capture Trips			0	0	0		0	0	0		0	0	0
Pass-By Trips			0	0	0		0	0	0		0	0	0
Volume Added to Adjacent Streets			151	413	564		444	274	718		3801	3795	7596

Total Weekday AM Peak Hour of Generator Internal Capture = 0 Percent

Total Weekday PM Peak Hour of Generator Internal Capture = 0 Percent

Total Weekday Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

TRIP GENERATION 10, TRAFFICWARE, LLC

Tierra Contenta Phase 3A
Traffic Addendum

Appendix B
Synchro 10 Results
Western Intersection
Jaguar Drive & Paseo del Sol

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵	↵		↵	↵		↵	↑		↵	↵	
Traffic Vol, veh/h	31	157	5	236	116	39	25	114	90	57	116	19
Future Vol, veh/h	31	157	5	236	116	39	25	114	90	57	116	19
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	215	7	257	126	42	28	128	101	67	136	22
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	14.3	15.3	14.5	12.8
HCM LOS	B	C	B	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	56%	0%	75%	0%	97%	0%	86%
Vol Right, %	0%	44%	0%	25%	0%	3%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	204	236	155	31	162	57	135
LT Vol	25	0	236	0	31	0	57	0
Through Vol	0	114	0	116	0	157	0	116
RT Vol	0	90	0	39	0	5	0	19
Lane Flow Rate	28	229	257	168	42	222	67	159
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.06	0.438	0.515	0.306	0.089	0.43	0.145	0.316
Departure Headway (Hd)	7.705	6.877	7.233	6.544	7.515	6.982	7.772	7.159
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	465	525	500	549	477	517	462	502
Service Time	5.443	4.615	4.97	4.28	5.254	4.72	5.513	4.9
HCM Lane V/C Ratio	0.06	0.436	0.514	0.306	0.088	0.429	0.145	0.317
HCM Control Delay	10.9	14.9	17.4	12.2	11	14.9	11.8	13.2
HCM Lane LOS	B	B	C	B	B	B	B	B
HCM 95th-tile Q	0.2	2.2	2.9	1.3	0.3	2.1	0.5	1.3

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	33	167	5	155	101	23	54	179	125	45	105	73
Future Vol, veh/h	33	167	5	155	101	23	54	179	125	45	105	73
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	209	6	178	116	26	64	213	149	54	125	87
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	15.5	14.5	21.5	14.4
HCM LOS	C	B	C	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	59%	0%	81%	0%	97%	0%	59%
Vol Right, %	0%	41%	0%	19%	0%	3%	0%	41%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	304	155	124	33	172	45	178
LT Vol	54	0	155	0	33	0	45	0
Through Vol	0	179	0	101	0	167	0	105
RT Vol	0	125	0	23	0	5	0	73
Lane Flow Rate	64	362	178	143	41	215	54	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.136	0.685	0.392	0.288	0.092	0.449	0.118	0.421
Departure Headway (Hd)	7.621	6.815	7.923	7.276	8.047	7.512	7.952	7.144
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	470	528	454	493	445	479	450	502
Service Time	5.376	4.57	5.684	5.038	5.809	5.274	5.715	4.906
HCM Lane V/C Ratio	0.136	0.686	0.392	0.29	0.092	0.449	0.12	0.422
HCM Control Delay	11.6	23.2	15.7	13	11.6	16.3	11.8	15
HCM Lane LOS	B	C	C	B	B	C	B	B
HCM 95th-tile Q	0.5	5.2	1.8	1.2	0.3	2.3	0.4	2.1

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	35	164	5	280	133	47	39	133	112	60	152	28
Future Vol, veh/h	35	164	5	280	133	47	39	133	112	60	152	28
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	225	7	304	145	51	44	149	126	71	179	33
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.1	21	18.7	16
HCM LOS	C	C	C	C

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	54%	0%	74%	0%	97%	0%	84%
Vol Right, %	0%	46%	0%	26%	0%	3%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	245	280	180	35	169	60	180
LT Vol	39	0	280	0	35	0	60	0
Through Vol	0	133	0	133	0	164	0	152
RT Vol	0	112	0	47	0	5	0	28
Lane Flow Rate	44	275	304	196	48	232	71	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.101	0.571	0.666	0.39	0.11	0.499	0.165	0.458
Departure Headway (Hd)	8.314	7.47	7.877	7.176	8.296	7.759	8.406	7.778
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	430	482	457	499	431	463	426	462
Service Time	6.084	5.239	5.647	4.946	6.074	5.537	6.179	5.551
HCM Lane V/C Ratio	0.102	0.571	0.665	0.393	0.111	0.501	0.167	0.459
HCM Control Delay	12	19.8	25.1	14.5	12.1	18.1	12.8	17
HCM Lane LOS	B	C	D	B	B	C	B	C
HCM 95th-tile Q	0.3	3.5	4.8	1.8	0.4	2.7	0.6	2.4

Intersection	
Intersection Delay, s/veh	24.5
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	51	192	5	188	105	29	66	228	174	51	138	84
Future Vol, veh/h	51	192	5	188	105	29	66	228	174	51	138	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	209	5	204	114	32	72	248	189	55	150	91
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.2	17	37.6	17.3
HCM LOS	C	C	E	C

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	57%	0%	78%	0%	97%	0%	62%
Vol Right, %	0%	43%	0%	22%	0%	3%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	402	188	134	51	197	51	222
LT Vol	66	0	188	0	51	0	51	0
Through Vol	0	228	0	105	0	192	0	138
RT Vol	0	174	0	29	0	5	0	84
Lane Flow Rate	72	437	204	146	55	214	55	241
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.16	0.872	0.482	0.316	0.134	0.484	0.131	0.515
Departure Headway (Hd)	8.011	7.186	8.494	7.821	8.672	8.136	8.476	7.685
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	446	503	423	457	411	441	421	466
Service Time	5.79	4.965	6.288	5.615	6.466	5.93	6.269	5.478
HCM Lane V/C Ratio	0.161	0.869	0.482	0.319	0.134	0.485	0.131	0.517
HCM Control Delay	12.3	41.8	19	14.2	12.8	18.4	12.6	18.4
HCM Lane LOS	B	E	C	B	B	C	B	C
HCM 95th-tile Q	0.6	9.4	2.6	1.3	0.5	2.6	0.4	2.9

Tierra Contenta Phase 3A
Traffic Addendum

Appendix C
Synchro 10 Results
Eastern Intersection
Jaguar Drive & Paseo del Sol

2033 Build Conditions
Jaguar & Paseo Del Sol

2033 AM Peak
Eastern Intersection



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	324	5	64	224	99	24	153	194	116	91	43
Future Volume (veh/h)	21	324	5	64	224	99	24	153	194	116	91	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	405	6	80	280	124	30	191	242	161	126	60
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	624	9	341	449	199	458	225	285	273	406	193
Arrive On Green	0.03	0.34	0.34	0.05	0.37	0.37	0.03	0.30	0.30	0.07	0.34	0.34
Sat Flow, veh/h	1781	1838	27	1781	1228	544	1781	750	950	1781	1197	570
Grp Volume(v), veh/h	26	0	411	80	0	404	30	0	433	161	0	186
Grp Sat Flow(s),veh/h/ln	1781	0	1865	1781	0	1772	1781	0	1699	1781	0	1768
Q Serve(g_s), s	0.7	0.0	14.0	2.1	0.0	14.1	0.9	0.0	18.0	4.7	0.0	5.8
Cycle Q Clear(g_c), s	0.7	0.0	14.0	2.1	0.0	14.1	0.9	0.0	18.0	4.7	0.0	5.8
Prop In Lane	1.00		0.01	1.00		0.31	1.00		0.56	1.00		0.32
Lane Grp Cap(c), veh/h	321	0	634	341	0	648	458	0	510	273	0	599
V/C Ratio(X)	0.08	0.00	0.65	0.23	0.00	0.62	0.07	0.00	0.85	0.59	0.00	0.31
Avail Cap(c_a), veh/h	390	0	634	364	0	648	527	0	803	273	0	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	21.0	15.9	0.0	19.6	17.3	0.0	24.7	19.0	0.0	18.3
Incr Delay (d2), s/veh	0.1	0.0	5.1	0.3	0.0	4.5	0.1	0.0	5.1	3.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	6.6	0.8	0.0	6.2	0.3	0.0	7.5	2.1	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	26.1	16.2	0.0	24.0	17.4	0.0	29.8	22.3	0.0	18.6
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		437			484			463			347	
Approach Delay, s/veh		25.5			22.7			29.0			20.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	32.0	9.5	27.0	8.6	30.0	6.6	29.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.7	16.1	6.7	20.0	4.1	16.0	2.9	7.8				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.6	0.0	1.7	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			24.6									
HCM 6th LOS			C									



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	7	183	37	145	198	48	16	149	115	80	188	50
Future Volume (veh/h)	7	183	37	145	198	48	16	149	115	80	188	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	8	201	41	151	206	50	20	182	140	90	211	56
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.82	0.82	0.82	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	460	472	96	504	557	135	327	223	172	298	384	102
Arrive On Green	0.01	0.31	0.31	0.08	0.38	0.38	0.02	0.23	0.23	0.07	0.27	0.27
Sat Flow, veh/h	1781	1508	308	1781	1454	353	1781	980	754	1781	1424	378
Grp Volume(v), veh/h	8	0	242	151	0	256	20	0	322	90	0	267
Grp Sat Flow(s),veh/h/ln	1781	0	1815	1781	0	1807	1781	0	1735	1781	0	1802
Q Serve(g_s), s	0.2	0.0	6.1	3.1	0.0	5.9	0.5	0.0	10.1	2.2	0.0	7.3
Cycle Q Clear(g_c), s	0.2	0.0	6.1	3.1	0.0	5.9	0.5	0.0	10.1	2.2	0.0	7.3
Prop In Lane	1.00		0.17	1.00		0.20	1.00		0.43	1.00		0.21
Lane Grp Cap(c), veh/h	460	0	568	504	0	692	327	0	395	298	0	487
V/C Ratio(X)	0.02	0.00	0.43	0.30	0.00	0.37	0.06	0.00	0.82	0.30	0.00	0.55
Avail Cap(c_a), veh/h	596	0	568	516	0	692	439	0	543	334	0	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.3	0.0	15.7	11.2	0.0	12.8	16.5	0.0	21.1	16.1	0.0	18.0
Incr Delay (d2), s/veh	0.0	0.0	2.3	0.3	0.0	1.5	0.1	0.0	6.8	0.6	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.6	1.1	0.0	2.4	0.2	0.0	4.5	0.8	0.0	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	0.0	18.0	11.5	0.0	14.3	16.6	0.0	27.9	16.7	0.0	19.0
LnGrp LOS	B	A	B	B	A	B	B	A	C	B	A	B
Approach Vol, veh/h		250			407			342			357	
Approach Delay, s/veh		17.9			13.2			27.2			18.4	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.1	26.5	8.3	17.6	9.1	22.5	5.9	20.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.2	7.9	4.2	12.1	5.1	8.1	2.5	9.3				
Green Ext Time (p_c), s	0.0	1.0	0.0	1.0	0.0	0.9	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay				19.0								
HCM 6th LOS				B								

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	379	5	15	237	109	25	178	215	119	102	46
Future Volume (veh/h)	21	379	5	15	237	109	25	178	215	119	102	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	474	6	19	296	136	31	222	269	165	142	64
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	631	8	238	408	187	484	256	310	269	452	204
Arrive On Green	0.03	0.34	0.34	0.02	0.34	0.34	0.03	0.33	0.33	0.07	0.37	0.37
Sat Flow, veh/h	1781	1843	23	1781	1213	557	1781	770	933	1781	1221	550
Grp Volume(v), veh/h	26	0	480	19	0	432	31	0	491	165	0	206
Grp Sat Flow(s),veh/h/ln	1781	0	1866	1781	0	1770	1781	0	1702	1781	0	1771
Q Serve(g_s), s	0.7	0.0	17.3	0.5	0.0	16.3	0.9	0.0	20.5	4.6	0.0	6.3
Cycle Q Clear(g_c), s	0.7	0.0	17.3	0.5	0.0	16.3	0.9	0.0	20.5	4.6	0.0	6.3
Prop In Lane	1.00		0.01	1.00		0.31	1.00		0.55	1.00		0.31
Lane Grp Cap(c), veh/h	261	0	639	238	0	595	484	0	567	269	0	656
V/C Ratio(X)	0.10	0.00	0.75	0.08	0.00	0.73	0.06	0.00	0.87	0.61	0.00	0.31
Avail Cap(c_a), veh/h	329	0	639	317	0	595	550	0	797	269	0	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	22.1	17.7	0.0	22.1	15.8	0.0	23.7	18.4	0.0	17.0
Incr Delay (d2), s/veh	0.2	0.0	8.0	0.1	0.0	7.6	0.1	0.0	7.3	4.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	8.5	0.2	0.0	7.6	0.3	0.0	8.9	2.1	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	0.0	30.1	17.9	0.0	29.7	15.9	0.0	31.0	22.5	0.0	17.3
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		506			451			522				371
Approach Delay, s/veh		29.4			29.2			30.1				19.6
Approach LOS		C			C			C				B
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	30.0	9.5	29.8	6.1	30.5	6.7	32.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.7	18.3	6.6	22.5	2.5	19.3	2.9	8.3				
Green Ext Time (p_c), s	0.0	1.6	0.0	2.7	0.0	1.6	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.6									
HCM 6th LOS			C									

2043 PM Peak
Jaguar & Paseo del Sol

Build Conditions
Eastern Intersection

Movement	NBL2	NBL	NBR	SEL	SER	SER2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	167	234	53	22	224	39	14	167	140	87	213	49
Future Volume (veh/h)	167	234	53	22	224	39	14	167	140	87	213	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No				No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	174	55	24	43	43	17	204	171	98	239	55
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.82	0.82	0.82	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	449	449	118	413	81	81	333	238	199	285	440	101
Arrive On Green	0.08	0.08	0.35	0.03	0.30	0.30	0.02	0.25	0.25	0.07	0.30	0.30
Sat Flow, veh/h	1781	1781	333	1781	271	271	1781	940	788	1781	1471	338
Grp Volume(v), veh/h	174	174	299	24	289	289	17	0	375	98	0	294
Grp Sat Flow(s),veh/h/ln	1781	1781	1810	1781	1822	1822	1781	0	1728	1781	0	1809
Q Serve(g_s), s	3.9	3.9	7.7	0.6	8.0	8.0	0.4	0.0	12.5	2.4	0.0	8.2
Cycle Q Clear(g_c), s	3.9	3.9	7.7	0.6	8.0	8.0	0.4	0.0	12.5	2.4	0.0	8.2
Prop In Lane	1.00	1.00	0.18	1.00	0.15	0.15	1.00		0.46	1.00		0.19
Lane Grp Cap(c), veh/h	449	449	641	413	544	544	333	0	437	285	0	542
V/C Ratio(X)	0.39	0.39	0.47	0.06	0.53	0.53	0.05	0.00	0.86	0.34	0.00	0.54
Avail Cap(c_a), veh/h	449	449	641	512	544	544	444	0	516	314	0	542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	13.0	15.1	14.0	17.6	17.6	16.3	0.0	21.5	16.0	0.0	17.7
Incr Delay (d2), s/veh	0.5	0.5	2.4	0.1	3.7	3.7	0.1	0.0	11.9	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.5	3.3	0.2	3.6	3.6	0.2	0.0	6.1	0.9	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.5	13.5	17.5	14.1	21.3	21.3	16.4	0.0	33.4	16.8	0.0	18.8
LnGrp LOS	B	B	B	B	C	C	B	A	C	B	A	B
Approach Vol, veh/h	473	473		313				392			392	
Approach Delay, s/veh	16.0	16.0		20.8				32.7			18.3	
Approach LOS	B	B		C				C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	25.8	8.5	19.7	9.5	22.5	5.7	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.6	9.7	4.4	14.5	5.9	10.0	2.4	10.2				
Green Ext Time (p_c), s	0.0	0.6	0.0	0.8	0.0	0.5	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay				21.7								
HCM 6th LOS				C								

Tierra Contenta Phase 3A
Traffic Addendum

Appendix D
Synchro 10 Results
Herrera Drive and Paseo del Sol

Intersection			
Intersection Delay, s/veh	12.1		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	719	387	376
Demand Flow Rate, veh/h	733	395	384
Vehicles Circulating, veh/h	340	58	286
Vehicles Exiting, veh/h	330	1015	167
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	17.9	5.6	7.5
Approach LOS	C	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	733	395	384
Cap Entry Lane, veh/h	976	1301	1031
Entry HV Adj Factor	0.981	0.981	0.979
Flow Entry, veh/h	719	387	376
Cap Entry, veh/h	957	1276	1009
V/C Ratio	0.751	0.304	0.373
Control Delay, s/veh	17.9	5.6	7.5
LOS	C	A	A
95th %tile Queue, veh	7	1	2

Intersection			
Intersection Delay, s/veh	7.9		
Intersection LOS	A		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	410	662	247
Demand Flow Rate, veh/h	418	675	252
Vehicles Circulating, veh/h	221	24	566
Vehicles Exiting, veh/h	597	615	133
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	7.2	7.9	8.6
Approach LOS	A	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	418	675	252
Cap Entry Lane, veh/h	1101	1346	775
Entry HV Adj Factor	0.982	0.981	0.980
Flow Entry, veh/h	410	662	247
Cap Entry, veh/h	1081	1320	759
V/C Ratio	0.380	0.501	0.325
Control Delay, s/veh	7.2	7.9	8.6
LOS	A	A	A
95th %tile Queue, veh	2	3	1

Intersection			
Intersection Delay, s/veh	12.1		
Intersection LOS	B		
Approach	EB	WB	SB
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	719	387	376
Demand Flow Rate, veh/h	733	395	384
Vehicles Circulating, veh/h	340	58	286
Vehicles Exiting, veh/h	330	1015	167
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	17.9	5.6	7.5
Approach LOS	C	A	A
Lane	Left	Left	Left
Designated Moves	LT	TR	LR
Assumed Moves	LT	TR	LR
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	733	395	384
Cap Entry Lane, veh/h	976	1301	1031
Entry HV Adj Factor	0.981	0.981	0.979
Flow Entry, veh/h	719	387	376
Cap Entry, veh/h	957	1276	1009
V/C Ratio	0.751	0.304	0.373
Control Delay, s/veh	17.9	5.6	7.5
LOS	C	A	A
95th %tile Queue, veh	7	1	2

Intersection			
Intersection Delay, s/veh	9.3		
Intersection LOS	A		
Approach	WB	SB	NE
Entry Lanes	1	1	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	721	308	485
Demand Flow Rate, veh/h	735	314	495
Vehicles Circulating, veh/h	28	630	278
Vehicles Exiting, veh/h	745	133	666
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	8.7	11.0	9.1
Approach LOS	A	B	A
Lane	Left	Left	Left
Designated Moves	LR	LR	R
Assumed Moves	LR	LR	R
RT Channelized			
Lane Util	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976
Entry Flow, veh/h	735	314	495
Cap Entry Lane, veh/h	1341	726	1039
Entry HV Adj Factor	0.981	0.981	0.980
Flow Entry, veh/h	721	308	485
Cap Entry, veh/h	1315	712	1018
V/C Ratio	0.548	0.433	0.476
Control Delay, s/veh	8.7	11.0	9.1
LOS	A	B	A
95th %tile Queue, veh	3	2	3

Tierra Contenta Phase 3A
Traffic Addendum

Appendix E

Synchro 10 Results

Western Loop Road and Paseo del Sol

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↵	↵		↵	↵		↵	↑		↵	↵	
Traffic Vol, veh/h	31	157	5	236	116	39	25	114	90	57	116	19
Future Vol, veh/h	31	157	5	236	116	39	25	114	90	57	116	19
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	42	215	7	257	126	42	28	128	101	67	136	22
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	14.3	15.3	14.5	12.8
HCM LOS	B	C	B	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	56%	0%	75%	0%	97%	0%	86%
Vol Right, %	0%	44%	0%	25%	0%	3%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	204	236	155	31	162	57	135
LT Vol	25	0	236	0	31	0	57	0
Through Vol	0	114	0	116	0	157	0	116
RT Vol	0	90	0	39	0	5	0	19
Lane Flow Rate	28	229	257	168	42	222	67	159
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.06	0.438	0.515	0.306	0.089	0.43	0.145	0.316
Departure Headway (Hd)	7.705	6.877	7.233	6.544	7.515	6.982	7.772	7.159
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	465	525	500	549	477	517	462	502
Service Time	5.443	4.615	4.97	4.28	5.254	4.72	5.513	4.9
HCM Lane V/C Ratio	0.06	0.436	0.514	0.306	0.088	0.429	0.145	0.317
HCM Control Delay	10.9	14.9	17.4	12.2	11	14.9	11.8	13.2
HCM Lane LOS	B	B	C	B	B	B	B	B
HCM 95th-tile Q	0.2	2.2	2.9	1.3	0.3	2.1	0.5	1.3

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	33	167	5	155	101	23	54	179	125	45	105	73
Future Vol, veh/h	33	167	5	155	101	23	54	179	125	45	105	73
Peak Hour Factor	0.80	0.80	0.80	0.87	0.87	0.87	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	209	6	178	116	26	64	213	149	54	125	87
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	15.5	14.5	21.5	14.4
HCM LOS	C	B	C	B

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	59%	0%	81%	0%	97%	0%	59%
Vol Right, %	0%	41%	0%	19%	0%	3%	0%	41%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	54	304	155	124	33	172	45	178
LT Vol	54	0	155	0	33	0	45	0
Through Vol	0	179	0	101	0	167	0	105
RT Vol	0	125	0	23	0	5	0	73
Lane Flow Rate	64	362	178	143	41	215	54	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.136	0.685	0.392	0.288	0.092	0.449	0.118	0.421
Departure Headway (Hd)	7.621	6.815	7.923	7.276	8.047	7.512	7.952	7.144
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	470	528	454	493	445	479	450	502
Service Time	5.376	4.57	5.684	5.038	5.809	5.274	5.715	4.906
HCM Lane V/C Ratio	0.136	0.686	0.392	0.29	0.092	0.449	0.12	0.422
HCM Control Delay	11.6	23.2	15.7	13	11.6	16.3	11.8	15
HCM Lane LOS	B	C	C	B	B	C	B	B
HCM 95th-tile Q	0.5	5.2	1.8	1.2	0.3	2.3	0.4	2.1

Intersection	
Intersection Delay, s/veh	18.7
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	35	164	5	280	133	47	39	133	112	60	152	28
Future Vol, veh/h	35	164	5	280	133	47	39	133	112	60	152	28
Peak Hour Factor	0.73	0.73	0.73	0.92	0.92	0.92	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	48	225	7	304	145	51	44	149	126	71	179	33
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.1	21	18.7	16
HCM LOS	C	C	C	C

Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	54%	0%	74%	0%	97%	0%	84%
Vol Right, %	0%	46%	0%	26%	0%	3%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	245	280	180	35	169	60	180
LT Vol	39	0	280	0	35	0	60	0
Through Vol	0	133	0	133	0	164	0	152
RT Vol	0	112	0	47	0	5	0	28
Lane Flow Rate	44	275	304	196	48	232	71	212
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.101	0.571	0.666	0.39	0.11	0.499	0.165	0.458
Departure Headway (Hd)	8.314	7.47	7.877	7.176	8.296	7.759	8.406	7.778
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	430	482	457	499	431	463	426	462
Service Time	6.084	5.239	5.647	4.946	6.074	5.537	6.179	5.551
HCM Lane V/C Ratio	0.102	0.571	0.665	0.393	0.111	0.501	0.167	0.459
HCM Control Delay	12	19.8	25.1	14.5	12.1	18.1	12.8	17
HCM Lane LOS	B	C	D	B	B	C	B	C
HCM 95th-tile Q	0.3	3.5	4.8	1.8	0.4	2.7	0.6	2.4

Intersection	
Intersection Delay, s/veh	24.5
Intersection LOS	C

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↶	↷		↶	↷		↶	↷		↶	↷	
Traffic Vol, veh/h	51	192	5	188	105	29	66	228	174	51	138	84
Future Vol, veh/h	51	192	5	188	105	29	66	228	174	51	138	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	55	209	5	204	114	32	72	248	189	55	150	91
Number of Lanes	1	1	0	1	1	0	1	1	0	1	1	0

Approach	SE	NW	NE	SW
Opposing Approach	NW	SE	SW	NE
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SW	NE	SE	NW
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NE	SW	NW	SE
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.2	17	37.6	17.3
HCM LOS	C	C	E	C

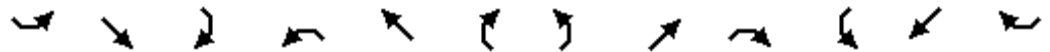
Lane	NELn1	NELn2	NWLn1	NWLn2	SELn1	SELn2	SWLn1	SWLn2
Vol Left, %	100%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	57%	0%	78%	0%	97%	0%	62%
Vol Right, %	0%	43%	0%	22%	0%	3%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	66	402	188	134	51	197	51	222
LT Vol	66	0	188	0	51	0	51	0
Through Vol	0	228	0	105	0	192	0	138
RT Vol	0	174	0	29	0	5	0	84
Lane Flow Rate	72	437	204	146	55	214	55	241
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.16	0.872	0.482	0.316	0.134	0.484	0.131	0.515
Departure Headway (Hd)	8.011	7.186	8.494	7.821	8.672	8.136	8.476	7.685
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	446	503	423	457	411	441	421	466
Service Time	5.79	4.965	6.288	5.615	6.466	5.93	6.269	5.478
HCM Lane V/C Ratio	0.161	0.869	0.482	0.319	0.134	0.485	0.131	0.517
HCM Control Delay	12.3	41.8	19	14.2	12.8	18.4	12.6	18.4
HCM Lane LOS	B	E	C	B	B	C	B	C
HCM 95th-tile Q	0.6	9.4	2.6	1.3	0.5	2.6	0.4	2.9

Tierra Contenta Phase 3A
Traffic Addendum

Appendix F
Synchro 10 Results
Eastern Loop Road and Paseo del Sol

2033 Build Conditions
Jaguar & Paseo Del Sol

2033 AM Peak
Eastern Intersection



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	324	5	64	224	99	24	153	194	116	91	43
Future Volume (veh/h)	21	324	5	64	224	99	24	153	194	116	91	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	405	6	80	280	124	30	191	242	161	126	60
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	624	9	341	449	199	458	225	285	273	406	193
Arrive On Green	0.03	0.34	0.34	0.05	0.37	0.37	0.03	0.30	0.30	0.07	0.34	0.34
Sat Flow, veh/h	1781	1838	27	1781	1228	544	1781	750	950	1781	1197	570
Grp Volume(v), veh/h	26	0	411	80	0	404	30	0	433	161	0	186
Grp Sat Flow(s),veh/h/ln	1781	0	1865	1781	0	1772	1781	0	1699	1781	0	1768
Q Serve(g_s), s	0.7	0.0	14.0	2.1	0.0	14.1	0.9	0.0	18.0	4.7	0.0	5.8
Cycle Q Clear(g_c), s	0.7	0.0	14.0	2.1	0.0	14.1	0.9	0.0	18.0	4.7	0.0	5.8
Prop In Lane	1.00		0.01	1.00		0.31	1.00		0.56	1.00		0.32
Lane Grp Cap(c), veh/h	321	0	634	341	0	648	458	0	510	273	0	599
V/C Ratio(X)	0.08	0.00	0.65	0.23	0.00	0.62	0.07	0.00	0.85	0.59	0.00	0.31
Avail Cap(c_a), veh/h	390	0	634	364	0	648	527	0	803	273	0	836
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	21.0	15.9	0.0	19.6	17.3	0.0	24.7	19.0	0.0	18.3
Incr Delay (d2), s/veh	0.1	0.0	5.1	0.3	0.0	4.5	0.1	0.0	5.1	3.4	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	6.6	0.8	0.0	6.2	0.3	0.0	7.5	2.1	0.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	0.0	26.1	16.2	0.0	24.0	17.4	0.0	29.8	22.3	0.0	18.6
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		437			484			463			347	
Approach Delay, s/veh		25.5			22.7			29.0			20.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	32.0	9.5	27.0	8.6	30.0	6.6	29.9				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.7	16.1	6.7	20.0	4.1	16.0	2.9	7.8				
Green Ext Time (p_c), s	0.0	1.7	0.0	2.6	0.0	1.7	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			24.6									
HCM 6th LOS			C									

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	21	379	5	15	237	109	25	178	215	119	102	46
Future Volume (veh/h)	21	379	5	15	237	109	25	178	215	119	102	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	474	6	19	296	136	31	222	269	165	142	64
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.72	0.72	0.72
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	631	8	238	408	187	484	256	310	269	452	204
Arrive On Green	0.03	0.34	0.34	0.02	0.34	0.34	0.03	0.33	0.33	0.07	0.37	0.37
Sat Flow, veh/h	1781	1843	23	1781	1213	557	1781	770	933	1781	1221	550
Grp Volume(v), veh/h	26	0	480	19	0	432	31	0	491	165	0	206
Grp Sat Flow(s),veh/h/ln	1781	0	1866	1781	0	1770	1781	0	1702	1781	0	1771
Q Serve(g_s), s	0.7	0.0	17.3	0.5	0.0	16.3	0.9	0.0	20.5	4.6	0.0	6.3
Cycle Q Clear(g_c), s	0.7	0.0	17.3	0.5	0.0	16.3	0.9	0.0	20.5	4.6	0.0	6.3
Prop In Lane	1.00		0.01	1.00		0.31	1.00		0.55	1.00		0.31
Lane Grp Cap(c), veh/h	261	0	639	238	0	595	484	0	567	269	0	656
V/C Ratio(X)	0.10	0.00	0.75	0.08	0.00	0.73	0.06	0.00	0.87	0.61	0.00	0.31
Avail Cap(c_a), veh/h	329	0	639	317	0	595	550	0	797	269	0	829
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	22.1	17.7	0.0	22.1	15.8	0.0	23.7	18.4	0.0	17.0
Incr Delay (d2), s/veh	0.2	0.0	8.0	0.1	0.0	7.6	0.1	0.0	7.3	4.1	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	8.5	0.2	0.0	7.6	0.3	0.0	8.9	2.1	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	0.0	30.1	17.9	0.0	29.7	15.9	0.0	31.0	22.5	0.0	17.3
LnGrp LOS	B	A	C	B	A	C	B	A	C	C	A	B
Approach Vol, veh/h		506			451			522				371
Approach Delay, s/veh		29.4			29.2			30.1				19.6
Approach LOS		C			C			C				B
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.6	30.0	9.5	29.8	6.1	30.5	6.7	32.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	25.5	5.0	35.5	5.0	25.5	5.0	35.5				
Max Q Clear Time (g_c+I1), s	2.7	18.3	6.6	22.5	2.5	19.3	2.9	8.3				
Green Ext Time (p_c), s	0.0	1.6	0.0	2.7	0.0	1.6	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			27.6									
HCM 6th LOS			C									

2043 PM Peak
Jaguar & Paseo del Sol

Build Conditions
Eastern Intersection

Movement	NBL2	NBL	NBR	SEL	SER	SER2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	167	234	53	22	224	39	14	167	140	87	213	49
Future Volume (veh/h)	167	234	53	22	224	39	14	167	140	87	213	49
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No				No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	174	55	24	43	43	17	204	171	98	239	55
Peak Hour Factor	0.96	0.96	0.96	0.91	0.91	0.91	0.82	0.82	0.82	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	449	449	118	413	81	81	333	238	199	285	440	101
Arrive On Green	0.08	0.08	0.35	0.03	0.30	0.30	0.02	0.25	0.25	0.07	0.30	0.30
Sat Flow, veh/h	1781	1781	333	1781	271	271	1781	940	788	1781	1471	338
Grp Volume(v), veh/h	174	174	299	24	289	289	17	0	375	98	0	294
Grp Sat Flow(s),veh/h/ln	1781	1781	1810	1781	1822	1822	1781	0	1728	1781	0	1809
Q Serve(g_s), s	3.9	3.9	7.7	0.6	8.0	8.0	0.4	0.0	12.5	2.4	0.0	8.2
Cycle Q Clear(g_c), s	3.9	3.9	7.7	0.6	8.0	8.0	0.4	0.0	12.5	2.4	0.0	8.2
Prop In Lane	1.00	1.00	0.18	1.00	0.15	0.15	1.00		0.46	1.00		0.19
Lane Grp Cap(c), veh/h	449	449	641	413	544	544	333	0	437	285	0	542
V/C Ratio(X)	0.39	0.39	0.47	0.06	0.53	0.53	0.05	0.00	0.86	0.34	0.00	0.54
Avail Cap(c_a), veh/h	449	449	641	512	544	544	444	0	516	314	0	542
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	13.0	15.1	14.0	17.6	17.6	16.3	0.0	21.5	16.0	0.0	17.7
Incr Delay (d2), s/veh	0.5	0.5	2.4	0.1	3.7	3.7	0.1	0.0	11.9	0.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.5	3.3	0.2	3.6	3.6	0.2	0.0	6.1	0.9	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.5	13.5	17.5	14.1	21.3	21.3	16.4	0.0	33.4	16.8	0.0	18.8
LnGrp LOS	B	B	B	B	C	C	B	A	C	B	A	B
Approach Vol, veh/h	473	473		313				392			392	
Approach Delay, s/veh	16.0	16.0		20.8				32.7			18.3	
Approach LOS	B	B		C				C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.2	25.8	8.5	19.7	9.5	22.5	5.7	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	5.0	18.0	5.0	18.0	5.0	18.0	5.0	18.0				
Max Q Clear Time (g_c+I1), s	2.6	9.7	4.4	14.5	5.9	10.0	2.4	10.2				
Green Ext Time (p_c), s	0.0	0.6	0.0	0.8	0.0	0.5	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay				21.7								
HCM 6th LOS				C								

TIERRA CONTENTA PHASE 3A DRAINAGE ANALYSIS

MAY 19, 2025



DESIGN ENGINUITY



Drainage Analysis Methodology

This drainage analysis is built upon several previous studies by others including the Tierra Contenta Drainage Study by Bohannon Huston, Inc. (BHI) in 1997 and Master Drainage Plan for Tierra Contenta (1998). The Tierra Contenta Master Drainage Plan defined as a primary objective to use open space for storm water detention to maximize the area available for lot development. Runoff from developed tracts would be conveyed via roads, storm sewers or natural drainage courses to detention ponds located in arroyo open space. The Rational Method,

$$\text{Ponding Volume} = \text{Change in \% Impermeable Area} \times \text{Area} \times 100\text{-year, 24-hour Precipitation}$$

was used to determine required ponding volume for each phase of development. A critical assumption is that the ponds drain within 24 hours to be ready for the next storm event. The following table was used to determine the percent of impermeable area by density or land use classification.

Density / Land Use Classification	Percent of Impermeable Area
Village Commercial	90%
Neighborhood commercial	90%
School/Community	80%
Residential Density of 10 to 20 d.u. per acre	70%
Residential Density of 6 to 9 d.u. per acre	55%
Residential Density of 1 to 5 d.u. per acre	45%
Developed Park (Activity Node)	20%
Undeveloped Open Space	5%

This same approach, referred to as the TC Drainage Analysis Method, has been used to size the Tierra Contenta Phase 3A (TC3A) detention ponds. Pond outlet release rates are calculated using TR-55 based on the 100-year, 24-hour storm event assuming a predevelopment condition. All ponds have overflows that will operate if the storm event exceeds the 100-year, 24-hour event precipitation of 3.24 inches.

TR-55 has been used to size culverts and pond release rates. Because the drainage plans associated with this report provide the backbone infrastructure that tract developers will be utilizing to convey flows to detention ponds, and because this engineer has experienced very localized storm events in Santa Fe in which one-inch of rainfall came down in 10 minutes, the culvert sizing is based on runoff from a 1000-year, 10-minute storm event (1.36"). It is assumed this critical storm event will occur after the ground surface is saturated and 100% of the rainfall becomes runoff.

Site Existing Conditions

Phase 3A of Tierra Contenta encompasses 216.5 acres of vacant land mostly sitting atop a mesa bounded by the Arroyo de los Chamisos on the south and west, and the "North Branch" of the Arroyo de los Chamisos to the north. Tierra Contenta Phase 3B owned by the New Mexico School for the Deaf lies to the east. The entire TC3A site is located within the Arroyo de los

Chamisos drainage basin. The Arroyo Chamisos South Sewer Interceptor (ACI) crosses the site and with its installation, a 32-foot-tall dam was installed on the North Branch of the Arroyo. The mesa top has several intersecting trails and vehicle scars, a smattering of trash, but for the most part is untouched. Nine acres of Phase 3B property flow towards TC3A and are included in the drainage calculations.

TC3A is located outside of any FEMA mapped flood zones, except for a small portion of land located south of the ACI in land that is to be designated as permanent open space (FEMA FIRM Panel 3504C0506E).

Ponding

The development of the ACI created a ponding area in the North Arroyo, which was designed by Bohannon Huston, Inc. (BHI, 1997) to handle the predicted increase in flow impacting this arroyo due to Tierra Contenta development. The dam installed on the North Arroyo has a single 8' x 6' concrete box culvert with a capacity of 660.9 cubic feet per second (CFS). BHI found this arroyo's 570-acre watershed produced 1116 CFS during the 100-year storm event and the 8' x 6' box culvert was installed to restrict flow to create a 31.2-acre-foot (AF) pond during the 100-year storm event. Currently 48.6 acres of TC3A flows to this ponding area, and thus makes up 8.52% of the total watershed. It has been assumed that 8.52% of the existing pond, or 2.8 Ac-Ft is detention ponding that serves TC3A.

Soils

On-site soils within the project site have been mapped by the US Natural Resource Conservation Service and the soil mapping can be found on their web page: websoilsurvey.nrcs.usda.gov and is shown on Figure 1. The majority of the mesa top is dominated by Panky loam and Agua Fria-Paraje complex. Both soils are well drained and classified as Hydrologic Soil Group C. The mesa's side slopes are dominated by Golodrina-Paraje complex, also a well-drained, C soil. About 70% of the site has Hydrologic Group C soils and 30% of the site has Hydrologic Group A soils.

Vegetation

The natural vegetation consists mostly of grasses and shrubs on top of the mesa with few juniper and pinon trees. Along the side slopes the juniper and pinon trees are more prevalent. Basal ground cover is considered fair, ranging from 30-70%.

Runoff Coefficient

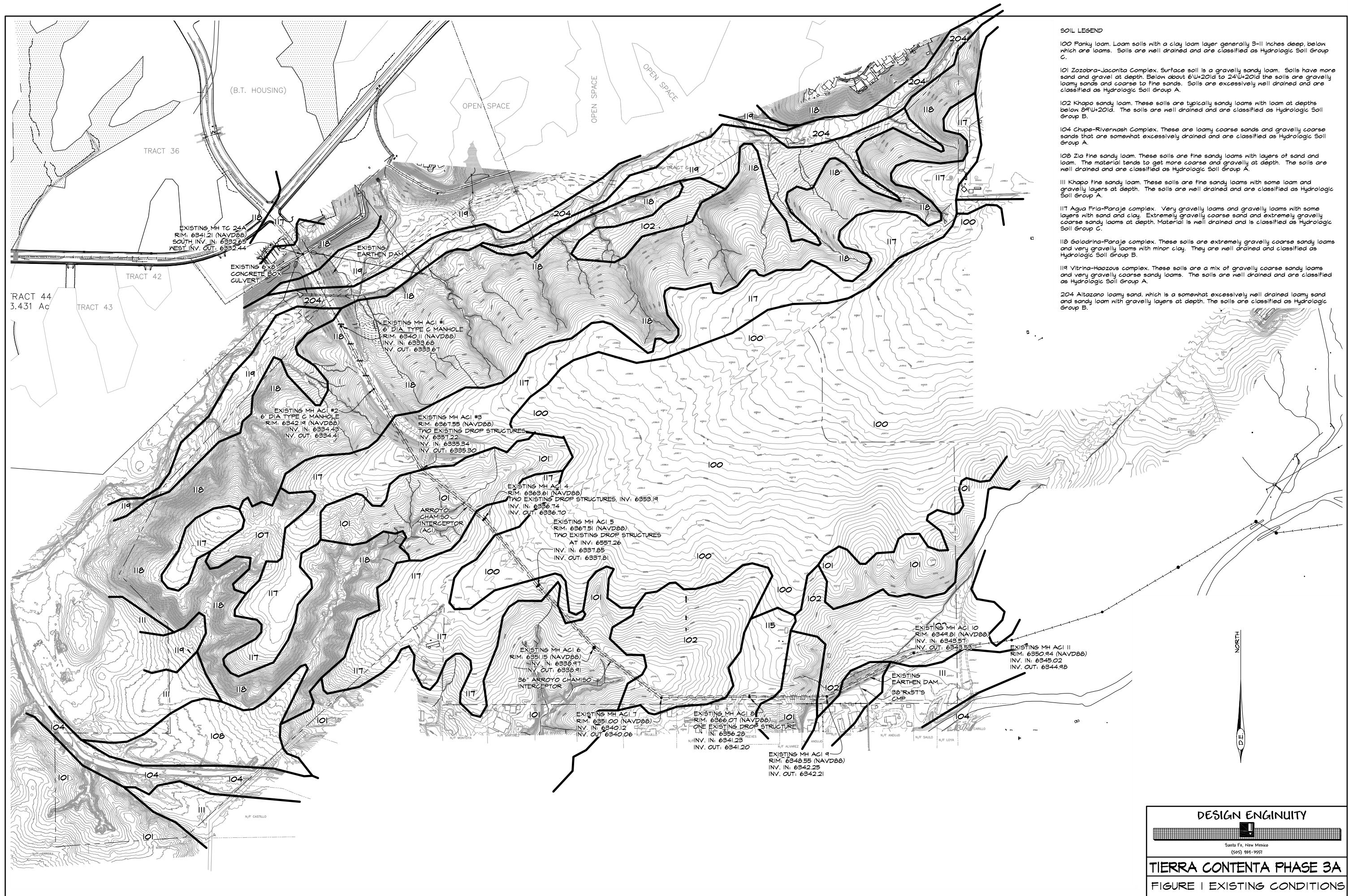
Based on the soil and vegetation present, existing runoff curve numbers range from 58-73. Curve numbers have been determined for each watershed and are used to calculate historic runoff in the project watersheds. For the purpose of sizing detention ponding, the TC Drainage Method assumes a 50% rainfall runoff for existing conditions, which is conservative given the site soil and vegetation and likely overestimates ponding requirements.

Precipitation Rate

NOAA has calculated the 100-year, 24-hour storm event to be 3.23 inches at the project site. The 1000-year, 24-hour storm event produces 1.36 inches (Table 1).

Watersheds

The existing site has been divided into 7 watersheds as delineated in Figure 2. Using TR-55, the 100-year, 24-hour storm event, each watershed's peak flows are shown in the following table. See Appendix A for calculations.



- SOIL LEGEND**
- 100 Fanky loam. Loam soils with a clay loam layer generally 3-11 inches deep, below which are loams. Soils are well drained and are classified as Hydrologic Soil Group C.
 - 101 Zozobra-Jaconita Complex. Surface soil is a gravelly sandy loam. Soils have more sand and gravel at depth. Below about 6'U+20'd to 24'U+20'd the soils are gravelly loamy sands and coarse to fine sands. Soils are excessively well drained and are classified as Hydrologic Soil Group A.
 - 102 Khapo sandy loam. These soils are typically sandy loams with loam at depths below 24'U+20'd. The soils are well drained and are classified as Hydrologic Soil Group B.
 - 104 Chupe-Riverwash Complex. These are loamy coarse sands and gravelly coarse sands that are somewhat excessively drained and are classified as Hydrologic Soil Group A.
 - 108 Zia fine sandy loam. These soils are fine sandy loams with layers of sand and loam. The material tends to get more coarse and gravelly at depth. The soils are well drained and are classified as Hydrologic Soil Group A.
 - 117 Khapo fine sandy loam. These soils are fine sandy loams with some loam and gravelly layers at depth. The soils are well drained and are classified as Hydrologic Soil Group A.
 - 117 Agua Fria-Paraje complex. Very gravelly loams and gravelly loams with some layers with sand and clay. Extremely gravelly coarse sand and extremely gravelly coarse sandy loams at depth. Material is well drained and is classified as Hydrologic Soil Group C.
 - 118 Goladrina-Paraje complex. These soils are extremely gravelly coarse sandy loams and very gravelly loams with minor clay. They are well drained and classified as Hydrologic Soil Group B.
 - 119 Vitrina-Hozous complex. These soils are a mix of gravelly coarse sandy loams and very gravelly coarse sandy loams. The soils are well drained and are classified as Hydrologic Soil Group A.
 - 204 Altazano loamy sand, which is a somewhat excessively well drained loamy sand and sandy loam with gravelly layers at depth. The soils are classified as Hydrologic Group B.

DESIGN ENGINEITY

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TIERRA CONTENTA PHASE 3A

FIGURE 1 EXISTING CONDITIONS

TABLE 1
NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: NM

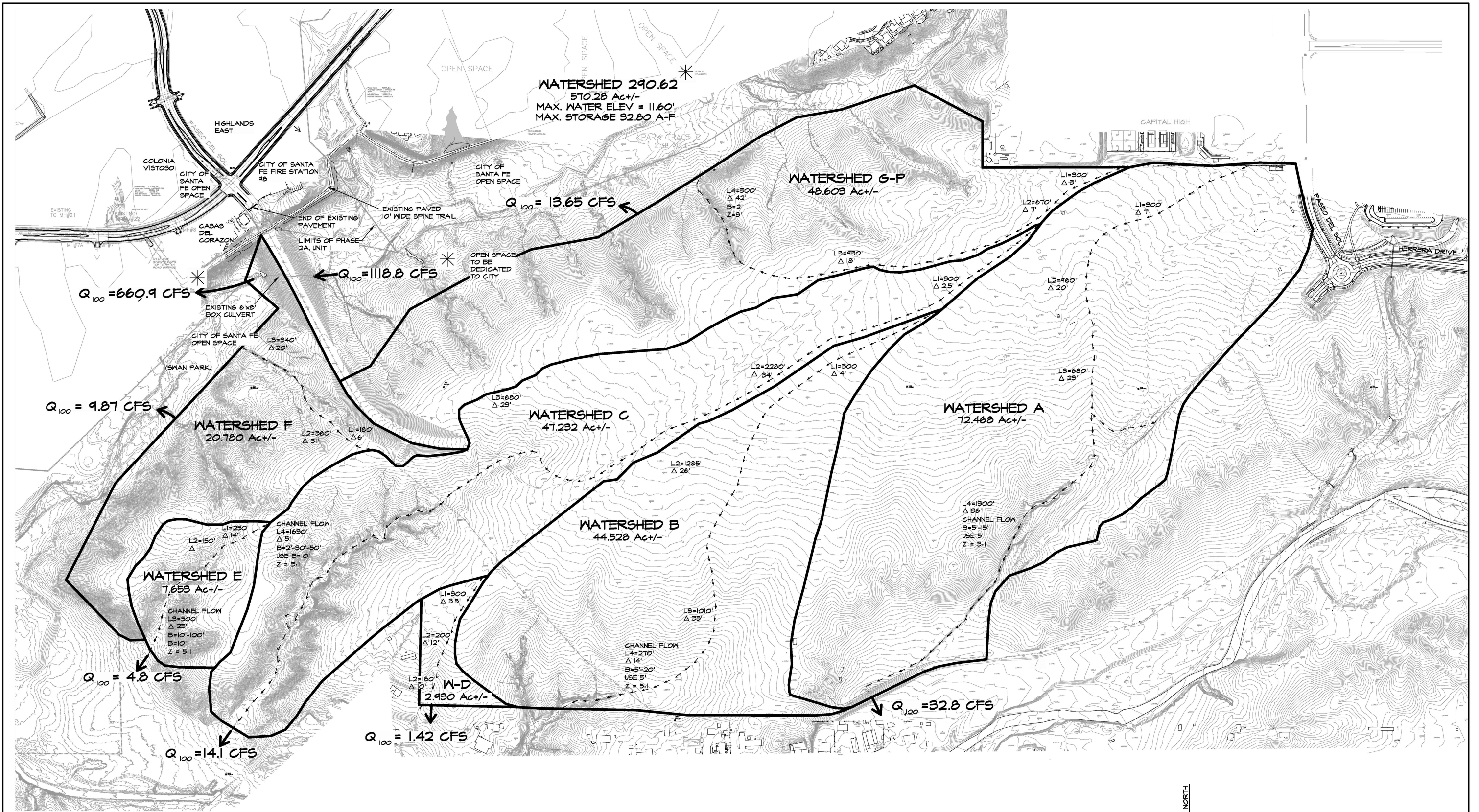
PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)¹

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.198 (0.171-0.228)	0.256 (0.221-0.296)	0.342 (0.294-0.395)	0.406 (0.350-0.469)	0.496 (0.424-0.571)	0.565 (0.481-0.651)	0.638 (0.540-0.734)	0.712 (0.599-0.820)	0.815 (0.678-0.937)	0.895 (0.740-1.03)
10-min	0.301 (0.260-0.347)	0.390 (0.337-0.451)	0.520 (0.448-0.601)	0.618 (0.532-0.714)	0.755 (0.646-0.870)	0.860 (0.732-0.990)	0.971 (0.822-1.12)	1.08 (0.912-1.25)	1.24 (1.03-1.43)	1.36 (1.13-1.57)
15-min	0.373 (0.323-0.430)	0.483 (0.418-0.559)	0.645 (0.556-0.745)	0.766 (0.660-0.886)	0.936 (0.800-1.08)	1.07 (0.908-1.23)	1.20 (1.02-1.38)	1.34 (1.13-1.55)	1.54 (1.28-1.77)	1.69 (1.40-1.94)
30-min	0.503 (0.435-0.579)	0.650 (0.562-0.754)	0.868 (0.748-1.00)	1.03 (0.889-1.19)	1.26 (1.08-1.45)	1.44 (1.22-1.65)	1.62 (1.37-1.86)	1.81 (1.52-2.08)	2.07 (1.72-2.38)	2.27 (1.88-2.62)
60-min	0.622 (0.538-0.717)	0.805 (0.696-0.933)	1.08 (0.926-1.24)	1.28 (1.10-1.48)	1.56 (1.33-1.80)	1.78 (1.51-2.05)	2.01 (1.70-2.31)	2.24 (1.88-2.58)	2.56 (2.13-2.95)	2.81 (2.33-3.24)
2-hr	0.744 (0.636-0.879)	0.948 (0.812-1.12)	1.25 (1.07-1.48)	1.49 (1.26-1.76)	1.81 (1.53-2.14)	2.08 (1.74-2.44)	2.35 (1.96-2.76)	2.64 (2.19-3.09)	3.04 (2.49-3.56)	3.36 (2.73-3.94)
3-hr	0.794 (0.689-0.934)	1.01 (0.871-1.18)	1.31 (1.13-1.54)	1.55 (1.33-1.82)	1.89 (1.61-2.21)	2.16 (1.83-2.52)	2.44 (2.06-2.84)	2.74 (2.29-3.19)	3.15 (2.60-3.66)	3.48 (2.85-4.05)
6-hr	0.911 (0.797-1.06)	1.15 (1.00-1.33)	1.47 (1.28-1.70)	1.71 (1.48-1.98)	2.06 (1.78-2.38)	2.33 (2.00-2.69)	2.61 (2.22-3.02)	2.90 (2.46-3.35)	3.30 (2.77-3.81)	3.62 (3.01-4.18)
12-hr	1.05 (0.925-1.20)	1.32 (1.16-1.51)	1.66 (1.46-1.90)	1.93 (1.69-2.21)	2.30 (2.01-2.63)	2.58 (2.24-2.95)	2.87 (2.48-3.28)	3.17 (2.72-3.62)	3.57 (3.04-4.08)	3.89 (3.29-4.45)
24-hr	1.22 (1.12-1.34)	1.52 (1.40-1.68)	1.90 (1.74-2.08)	2.20 (2.01-2.41)	2.60 (2.37-2.84)	2.92 (2.65-3.18)	3.23 (2.93-3.53)	3.56 (3.21-3.88)	3.99 (3.57-4.36)	4.33 (3.85-4.73)
2-day	1.38 (1.26-1.50)	1.72 (1.57-1.88)	2.13 (1.95-2.33)	2.46 (2.25-2.69)	2.91 (2.66-3.17)	3.25 (2.96-3.55)	3.61 (3.27-3.93)	3.96 (3.57-4.32)	4.43 (3.97-4.84)	4.80 (4.28-5.25)
3-day	1.50 (1.37-1.63)	1.86 (1.70-2.03)	2.31 (2.11-2.52)	2.66 (2.43-2.90)	3.14 (2.86-3.41)	3.50 (3.18-3.81)	3.88 (3.51-4.22)	4.25 (3.84-4.63)	4.75 (4.26-5.18)	5.14 (4.59-5.61)
4-day	1.61 (1.47-1.76)	2.01 (1.84-2.19)	2.48 (2.27-2.70)	2.86 (2.61-3.11)	3.36 (3.07-3.65)	3.75 (3.41-4.07)	4.15 (3.76-4.50)	4.54 (4.10-4.93)	5.08 (4.56-5.51)	5.48 (4.90-5.96)
7-day	1.88 (1.73-2.04)	2.34 (2.16-2.54)	2.87 (2.64-3.11)	3.28 (3.02-3.55)	3.83 (3.52-4.14)	4.24 (3.89-4.59)	4.66 (4.26-5.04)	5.07 (4.63-5.49)	5.61 (5.10-6.09)	6.02 (5.44-6.54)
10-day	2.11 (1.94-2.30)	2.62 (2.42-2.86)	3.22 (2.97-3.51)	3.69 (3.40-4.02)	4.32 (3.98-4.70)	4.80 (4.40-5.23)	5.29 (4.84-5.76)	5.77 (5.26-6.28)	6.40 (5.80-6.98)	6.88 (6.21-7.52)
20-day	2.79 (2.57-3.04)	3.47 (3.20-3.78)	4.22 (3.89-4.60)	4.79 (4.42-5.22)	5.53 (5.09-6.02)	6.07 (5.58-6.61)	6.60 (6.05-7.19)	7.11 (6.51-7.76)	7.75 (7.08-8.46)	8.22 (7.48-8.99)
30-day	3.43 (3.18-3.70)	4.26 (3.96-4.60)	5.15 (4.78-5.55)	5.81 (5.40-6.26)	6.64 (6.16-7.15)	7.24 (6.71-7.80)	7.82 (7.23-8.43)	8.37 (7.72-9.02)	9.05 (8.32-9.78)	9.53 (8.74-10.3)
45-day	4.26 (3.98-4.56)	5.28 (4.93-5.65)	6.31 (5.89-6.75)	7.07 (6.59-7.55)	7.99 (7.45-8.53)	8.63 (8.04-9.21)	9.24 (8.59-9.85)	9.79 (9.10-10.4)	10.5 (9.69-11.2)	10.9 (10.1-11.6)
60-day	4.91 (4.60-5.25)	6.09 (5.70-6.53)	7.28 (6.83-7.80)	8.14 (7.63-8.72)	9.19 (8.61-9.84)	9.92 (9.28-10.6)	10.6 (9.91-11.4)	11.2 (10.5-12.0)	12.0 (11.2-12.8)	12.5 (11.6-13.4)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information



* SOURCE: BOHANNON HUSTON, JULY 23, 1997
 TIERRA CONTENTA DRAINAGE STUDY.
 WATERSHED B,C & E WAS LABELED BY BOHANNON HUSTON AS 290.51
 WATERSHED A WAS LABELED B&H AS 290.33



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FIGURE 2 EXISTING WATERSHEDS

WATERSHED	ACREAGE	CURVE NUMBER	TIME OF CONCENTRATION, HOURS	Q100, 24-HOUR, PEAK DISCHARGE, CFS	RUNOFF VOLUME, CU. FT
A	72.47	65.5	0.717	32.75	167,419
B	44.53	67.9	0.863	20.55	120,303
C	47.23	65.5	1.169	14.13	109,118
D	2.93	65.5	0.651	1.42	6,769
E	7.65	61.75	0.322	4.82	13,455
F	20.78	58.0	0.308	9.87	26,539
G	48.6	61.75	0.918	13.65	85,448

The outlet structures of the detention ponds were designed to discharge at or below the Q100, 24-hour peak discharge rates listed above.












Tierra Contenta Phase 3A Plans

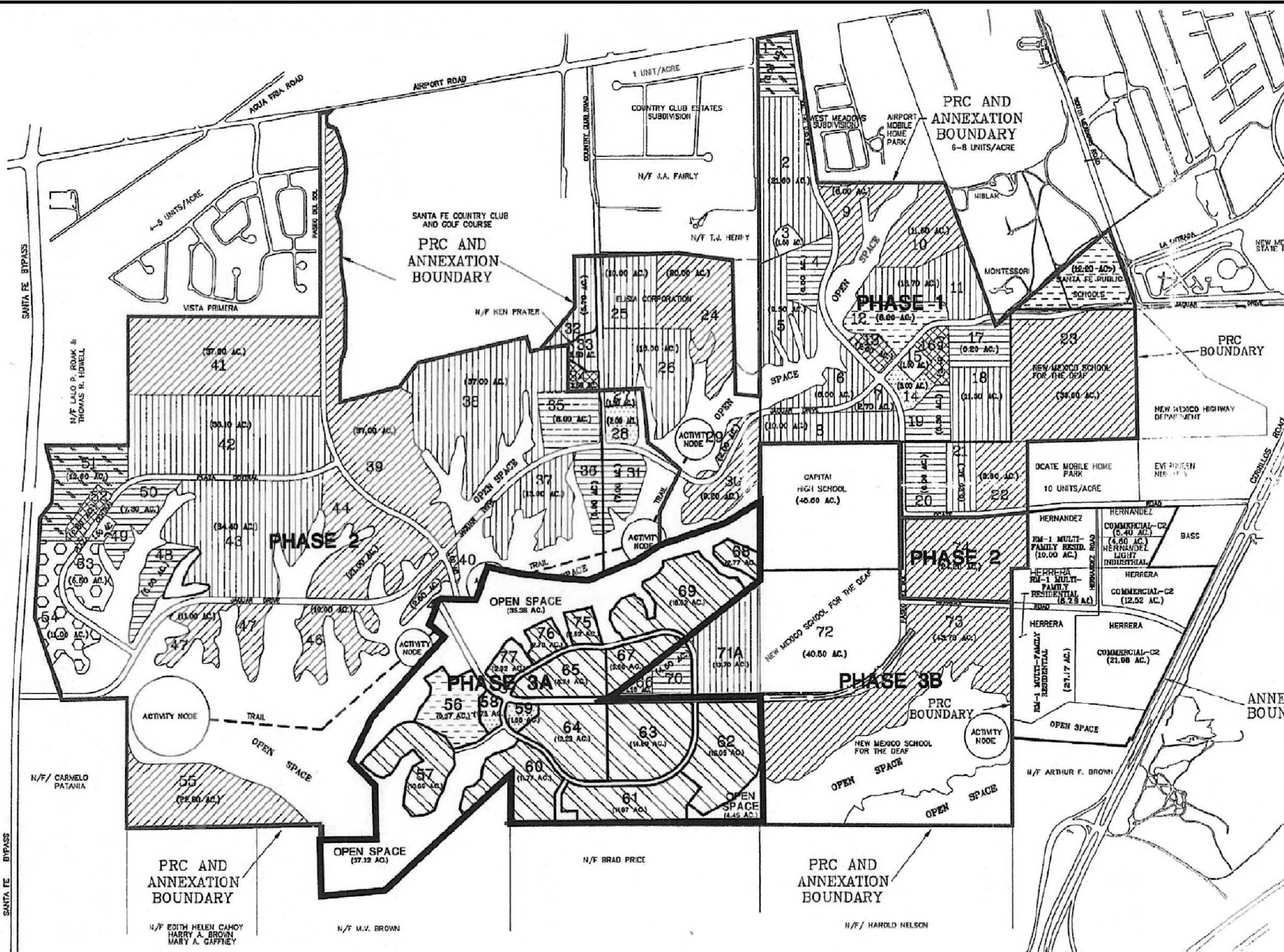
The approved TC3A Master Plan (Figure 3) creates 14 tracts for mixed residential development, a 10.25-acre school site and two mixed use tracts. The mixed residential designation allows 1175 to 1500 dwelling units to be developed within the project but does not designate specific density by tract. Thus, a given tract could be R-1 or R-20 as long as the adopted Design Guidelines are met and the entire TC3A site does not exceed a maximum of 1500 dwelling units. The potential range of density makes calculating anticipated runoff difficult. But practically it is very unlikely that steeper sloped tracts will have densities exceeding R-6, and the flatter mesa top tracts will likely have densities exceeding R-10. The two mixed use tracts could have government and neighborhood commercial uses.

The Master Drainage Plan for Tierra Contenta (1998) defined percent of impermeable area by density or land use classification as follows:

Density / Land Use Classification	Percent of Impermeable Area
Village Commercial	90%
Neighborhood commercial	90%
School/Community	80%
Residential Density of 10 to 20 d.u. per acre	70%
Residential Density of 6 to 9 d.u. per acre	55%
Residential Density of 1 to 5 d.u. per acre	45%
Developed Park (Activity Node)	20%
Undeveloped Open Space	5%

LEGEND

-  MIXED RESIDENTIAL
-  RESIDENTIAL - 10-20 DU/AC. (AVERAGE 17 DU/AC.)
-  RESIDENTIAL - 6-8 DU/AC. (AVERAGE 7.40 DU/AC.)
-  RESIDENTIAL - 1-5 DU/AC. (AVERAGE 4.60 DU/AC.)
-  VILLAGE COMMERCIAL
-  NEIGHBORHOOD COMMERCIAL
-  OFFICE/BUSINESS INCUBATOR
-  COMMUNITY
-  SCHOOL
-  PARK AND OPEN SPACE
-  MAJOR ROADWAYS



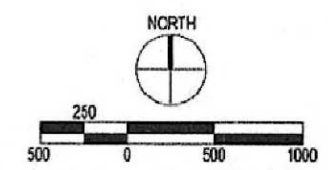
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TIERRA CONTENTA PHASE 3A

FIGURE 3 PHASE 3A MASTER PLAN

**MASTER PLAN
AMENDMENT #1
OVERVIEW**



**TIERRA CONTENTA
PHASE 3A
SANTA FE, NEW MEXICO**

TIERRA CONTENTA CORPORATION
SEC PLANNING, LLC
JENKINS GAVIN, INC.
DESIGN ENGINEUTY

REVISION BOX

NO.	DATE	REVISION	BY
1	12-20-93	MAZRIA ADDITIONS	JG&A
2	1-5-94	CITY ADDITIONS(PORTER)	JG&A

PURPOSE STATEMENT: THE PURPOSE OF TIERRA CONTENTA MASTER PLAN AMENDMENT #1 IS TO ALTER LAND USES AND RESIDENTIAL DENSITIES IN PHASE 3A ONLY.

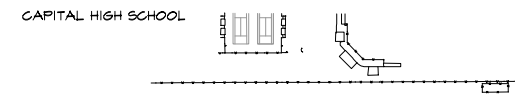
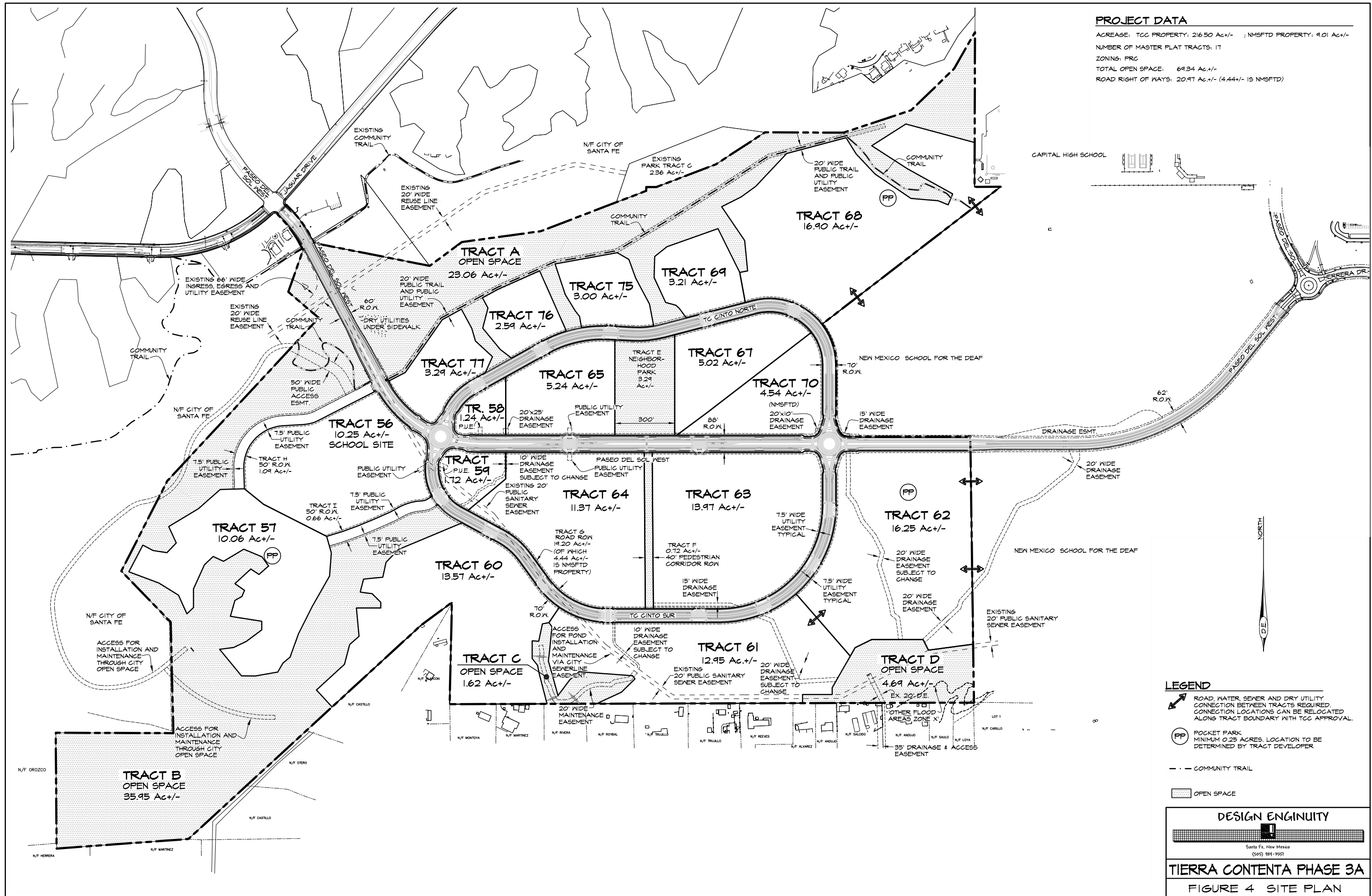
For this analysis the above was modified to include road right of ways at 95% impermeable.

The TC3A tract layout has been refined and Figure 4 shows the current project site plan. Each tract's anticipated density and impervious acreage is shown in the following table.

TRACT NO.	LAND USE	ACREAGE	LIKELY MAX DENSITY	PERCENT IMPERVIOUS	IMPERVIOUS ACRES
56	SCHOOL	10.25		80%	8.2
57	MIXED RESIDENTIAL	10.06	R 6-9	55%	5.533
58	MIXED USE	1.23		90%	0.984
59	MIXED USE	1.73		90%	1.384
60	MIXED RESIDENTIAL	13.57	R 6-9	55%	7.4635
61	MIXED RESIDENTIAL	12.95	R 6-9	55%	7.1225
62	MIXED RESIDENTIAL	16.25	R 6-9	55%	8.9375
63	MIXED RESIDENTIAL	13.97	R 10-20	70%	9.779
64	MIXED RESIDENTIAL	11.37	R 10-20	70%	7.959
65	MIXED RESIDENTIAL	5.2	R 10-20	70%	3.64
67	MIXED RESIDENTIAL	5.02	R 10-20	70%	3.514
68	MIXED RESIDENTIAL	16.9	R 6-9	55%	9.295
69	MIXED RESIDENTIAL	3.21	R 6-9	55%	1.7655
70	MIXED RESIDENTIAL (NMSFTD)	4.55	R 10-20	70%	3.185
75	MIXED RESIDENTIAL	3	R 6-9	55%	1.65
76	MIXED RESIDENTIAL	2.59	R 6-9	55%	1.4245
77	MIXED RESIDENTIAL	3.3	R 6-9	55%	1.815
TRACT A	OPEN SPACE	23.08		5%	1.154
TRACT B	OPEN SPACE	36.26		5%	1.813
TRACT C	OPEN SPACE	1.62		5%	0.081
TRACT D	OPEN SPACE	4.69		5%	0.2345
TRACT E	PARK	3.29		20%	0.658
TRACT F	PED CORRIDOR	0.72		20%	0.146
TRACT G	ROAD ROW (INCL. NMSFTD LAND)	19.22		95%	18.34
TRACT H	ROAD ROW	1.09		95%	0.81
TRACT I	ROAD ROW	0.66		95%	0.66
SUM		224.63		ACRES	107.548

PROJECT DATA

ACREAGE: TCC PROPERTY: 216.50 Ac+/- ; NMSFTD PROPERTY: 9.01 Ac+/-
 NUMBER OF MASTER PLAT TRACTS: 17
 ZONING: FRC
 TOTAL OPEN SPACE: 69.34 Ac+/-
 ROAD RIGHT OF WAYS: 20.97 Ac+/- (4.44+/- IS NMSFTD)



- LEGEND**
- ROAD, WATER, SEWER AND DRY UTILITY CONNECTION BETWEEN TRACTS REQUIRED. CONNECTION LOCATIONS CAN BE RELOCATED ALONG TRACT BOUNDARY WITH TCC APPROVAL.
 - POCKET PARK. MINIMUM 0.25 ACRES. LOCATION TO BE DETERMINED BY TRACT DEVELOPER.
 - COMMUNITY TRAIL
 - OPEN SPACE

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TIERRA CONTENTA PHASE 3A
 FIGURE 4 SITE PLAN

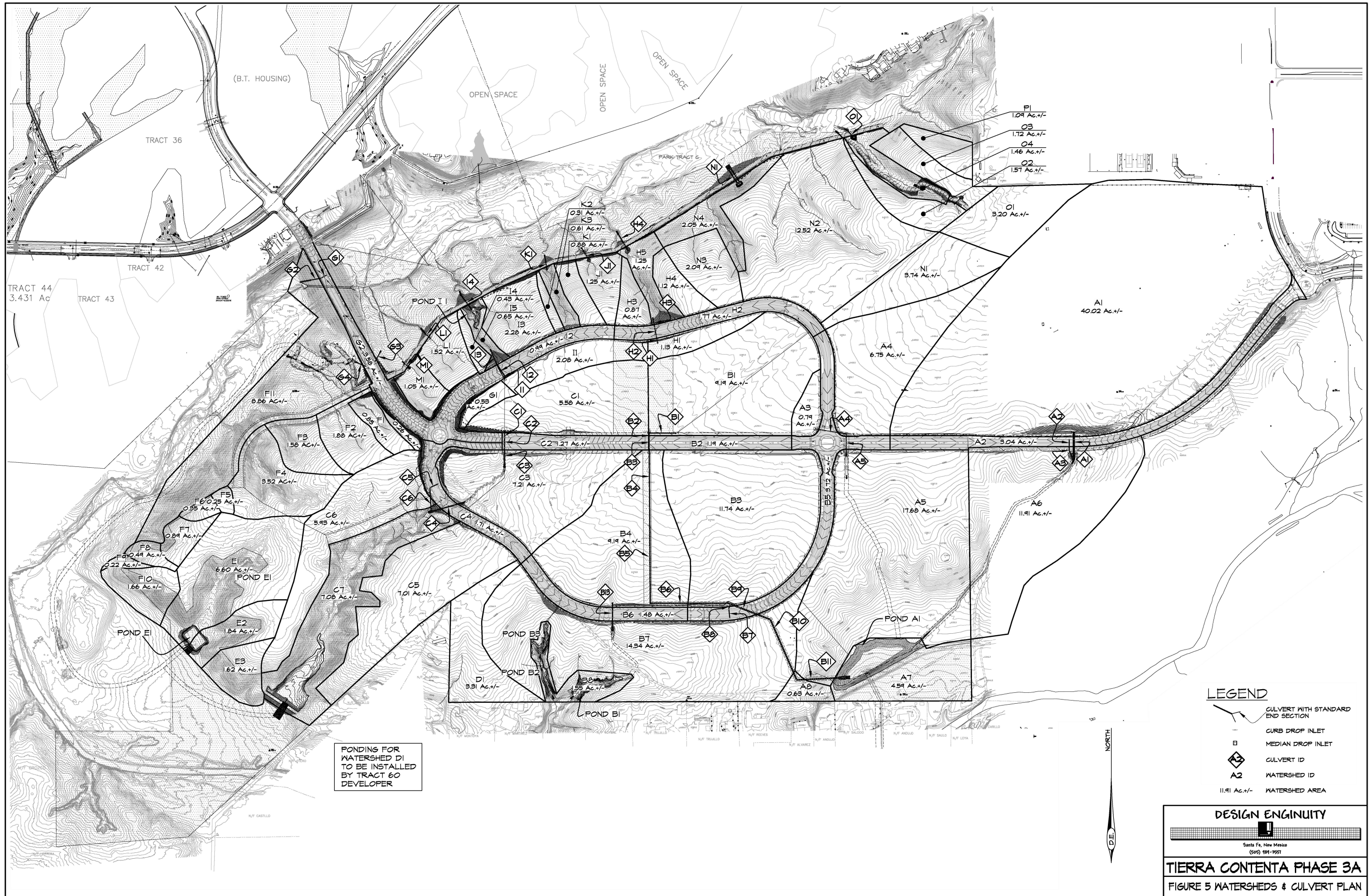
Detention Pond Requirements by Watershed

The project site has been divided into 16 watersheds as shown on Figure 5. Each watershed was subdivided into subbasins as necessary to determine flows to culverts. Watershed B's terrain limits detention pond development, so much of that watershed has been directed to Watershed A via a storm drain system. A total of 13.73 AF of detention ponding is required to accommodate full building out of TC3A. A summary of each watershed's required ponding is as follows. The required detention ponding calculations can be found in Appendix B.

WATERSHED	DEVELOPED ACREAGE	IMPERVIOUS ACREAGE	REQUIRED DETENTION PONDING, AF
A	113.68	37.8	4.58
B	23.50	13.7	1.65
C	35.79	21.0	2.54
D	3.31	1.8	0.22
E	10.06	3.4	0.41
F	19.28	8.6	1.04
G	4.11	3.8	0.46
H	6.14	3.6	0.44
I	6.43	4.0	0.48
J	1.25	0.7	0.08
K	1.80	0.7	0.08
L	1.52	0.8	0.10
M	1.05	0.6	0.07
N	20.40	9.8	1.19
O	7.95	2.4	0.29
P	1.09	0.7	0.09
TOTAL	257.36	113.36	13.73







Planned Detention Ponding

Seven new ponds will be constructed along with the backbone infrastructure to provide the required detention ponding as shown on Figure 5. It has been assumed that 2.8 AF or 8.52% of the existing 31.2 AF pond located in the North Arroyo along with Pond I1 will address the detention ponding required for Watersheds F-P. Watershed D located on the south boundary of the project will not have a detention pond built with the project spine infrastructure. A detention pond will have to be incorporated into the future development plans for Tract 60 by that tract's developer. This engineer assumed that Tract 60 would be developed at a density of 6-9 and that 0.22 AF of ponding will be required. At the time plans are prepared for this tract, these assumptions should be reevaluated. Even though total planned detention ponding exceeds what is required by code, ponding must be constructed in Watershed D to protect downhill residents from incurring flows above expected historic conditions. The total ponding planned to be built with the project infrastructure plans along with existing ponding totals 15.84 AF, which is



PONDING FOR WATERSHED DI TO BE INSTALLED BY TRACT 60 DEVELOPER

LEGEND

-  CULVERT WITH STANDARD END SECTION
-  CURB DROP INLET
-  MEDIAN DROP INLET
-  CULVERT ID
-  WATERSHED ID
-  11.91 Ac. +/- WATERSHED AREA

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TIERRA CONTENTA PHASE 3A

FIGURE 5 WATERSHEDS & CULVERT PLAN

2.11 AF more than the required 13.73 AF. Pond outlet structures have been designed to meet historic flows from the watershed in which it discharges. Each pond's size is shown on the table below and the ponds' locations are shown on Figure 5.

POND ID	HOLDING CAPACITY, AF
POND A1	6.75
POND B1	1.31
POND B2	0.44
POND B3	0.42
POND C1	3.07
POND E1	0.54
POND I1	0.52
EX POND	2.80
TOTAL	15.84

DETENTION PONDING ASSOCIATED WITH FLOWS TO NORTH ARROYO

Ponding in the arroyo located north of TC3 was developed in 1999 as part of the ACI project. This gravity 36-inch RCP interceptor serves a majority of the current wastewater flows in the City of Santa Fe. The North Arroyo was dammed with a 33-foot tall and 240-foot-wide earthen dam which carries the shallowly buried ACI across the North Arroyo. A 6-foot by 8-foot concrete box culvert was installed per the BHI's recommendation presented in their July 23, 1997, Tierra Contenta Drainage Study. That study found that the north arroyo's watershed is 570 acres and at full build out would produce 1118.8 CFS during a 100-year storm event. The flow was restricted by the 6-foot by 8-foot box's capacity which was calculated by BHI to have a capacity of 660.9 cfs when the pond was full. They found the water surface would rise 11.6 feet and the total ponding holding capacity was 32.80 AF.

Watershed G-P (Figure 2) with a total acreage of 48.60 from TC3 flows into this existing pond. Given that Watershed G-P make up 8.52% of the total watershed (48.60/570.28), it is reasonable to assume that 8.52% of the existing pond was to serve TC3, or 2.80 AF. Using the TC Drainage Method for sizing detention ponds, the total ponding required for post development watersheds G thru P is 3.28 AF. Using the TR-55 method, a ponding requirement of 2.54 AF is necessary. Thus, the existing pond is 0.48 AF undersized based on the TC Drainage Method for sizing detention ponds and 0.26 AF more than necessary using the TR-55 method. Another pond (Pond I1) will be developed in a small arroyo crossed by a new sewer access road/community trail. This pond is designed to detain 0.52 AF during the 100-year, 24-hour storm event. Releases from the pond will be via a controlled outlet structure with a top grate and a 6" diameter opening at the bottom of the pond. The peak discharge from the 6" diameter opening will be 3.7 CFS when the pond is full. For the 1000-year, 24-hour storm event when a calculate peak flow of 50 CFS passes through this arroyo, the top grate will operate as a weir and can accommodate 70 CFS with more than 1-foot of freeboard. Appendix C provides detailed calculations on pond outlet design.

With the North Arroyo pond's 2.80 AF and Pond I1's 0.52 AF, a total of 3.32 AF of ponding will be provided, just over the 3.28 AF required.

DETENTION PONDING ASSOCIATED WITH FLOWS TO THE ARROYO CHAMISO

Pond A1 is in Watershed A on the southeast side of the project. The pond exists today due to the installation of an earthen dam associated with the ACI construction. This pond will be enlarged to detain 6.75 AF, although only 4.58 AF is required. The pond currently has a release pipe that is a 38" R x 58" S CMP that carries flows directly to the Arroyo de Los Chamisos. The estimated capacity of this pipe is 120 CFS. Historic peak flows from Watershed A are calculated to be 32.75 CFS during the 100-year storm event. Therefore, a controlled outlet structure will be connected to the outlet pipe, restricting flow through a 23-inch opening at the base of the pond which will release 32 CFS when the pond is holding 4.58 AF. This accommodates the 100-year storm event and provides for 1.85 feet of freeboard in the pond. In a larger storm event, the water can rise and start flowing into the outlet structure's top grate. The limiting factor is the existing outlet pipe's capacity of 120 CFS. The pond must rise to 1.4 feet over the grate for the outlet structure to release 120 CFS, which will leave 9-inches of freeboard.

Pond B1, B2 and B3 are in existing arroyos at the south end of Watershed B. The required ponding in this watershed is 1.65 AF and the total holding capacity of the ponds is 2.23 AF. All three ponds outlet structure is of the same design. The ponds will be created by the installation of 10' tall gabion dams in the arroyos with a bottom release 3' tall and 6-inches wide with a capacity of 9.37 cfs when a pond is full. Together the two lower ponds will release a total of 18.74 CFS during the 100-year, 24-hour storm event, which is below the calculated historic rate of 20.55 CFS. To accommodate larger storms, a 6' wide, 1' deep overflow weir will be installed, which will accommodate another 20 CFS. These ponds discharge to an arroyo passing through a residential neighborhood to the south.

Pond C1 is in Watershed C. The pond will be an 8-foot-tall earthen dam with a 15-inch CMP release at its base and a 30' wide concrete spillway at its top. The pond can detain 3.07 AF. The outlet capacity of the 15-inch pipe is 14 CFS which matches the calculated pre-development peak flow for the 100-year storm event. To accommodate flows in excess of a 100-year storm event, the weir has been designed with a capacity of 102 CFS. This pond discharges to City of Santa Fe open space and will flow into the Arroyo de Los Chamisos.

Watershed D is 3.31± acres and there is no location where a detention pond could be installed that would be accessible for maintenance by the city and not greatly impact the site for development. Therefore, the developer of Tract 60 will be required to either provide on-lot ponding or centralized ponding that fits into the site's development. The ponding must compensate for all impervious areas within Watershed D. The calculated pre-development flow from Watershed D for the 100-year, 24-hour storm event is 1.42 CFS. Required ponding using the TC Drainage method for calculating detention ponding is 0.22 AF based on the assumption that 55% of the watershed will be impervious. Tract 60 may choose to refine the required ponding based on actual planned impervious area.

Pond E1 is in Watershed E and has a capacity of 0.48 AF. This pond will require some site grading and the development of earthen berms around the pond. The pond depth is only 3-feet. There will be an 8" outlet pipe at its base with a capacity of 4.17 CFS, slightly below the calculated historic flow rate of 4.82 CFS for the 100-year storm event. To accommodate flows in

excess of a 100-year storm event, the weir has been designed with a capacity of 24.3 CFS. This pond discharges into City of Santa Fe open space and then flows into the Arroyo de Los Chamisos.

Watershed F is located upgradient of the confluence of the North Arroyo and the Arroyo de Los Chamisos. Watershed F, like Watershed G-P, can be divided into several separate small watersheds and this engineer did that, creating 11 distinct watersheds for the purpose of sizing culverts under a planned road and trail that was later value engineered out of the plans. All of these small watersheds have a very steep north slope into the north arroyo and no location where a 10-foot-high dam would contain more than a few thousand cubic feet of water. Based on the TC Drainage Method for calculating detention ponding a total of 1.04 AF is required. Using the TR-55 method, a ponding requirement of 0.75 AF is necessary. Another 6 or more ponds would have to be developed to accommodate these volumes. Given that there is no development downgradient from Watershed F and that the TC3A's total required ponding, including Watershed F totals 13.73 AF while 15.84 AF is to be installed, it was determined it was acceptable to not contain flows from this watershed.

Roadway Capacity

The road sections were evaluated to determine if they could contain the 1000-year, 10-minute storm (1.36" in 10 minutes) assuming 100% runoff. This event would produce 8.228 CFS/Acre of roadway. In all cases, road curbs are 6" tall and roads have a cross slope of 2%. The flattest roads have a road grade of 0.5% and have a capacity of 15.5 CFS within the curbs and can contain runoff from 1.9 acres of roadway. The steepest roads have a 5% grade and have a capacity to contain 52 CFS which is the runoff from 6.2 acres of roadway. On Paseo Del Sol at Sta 19+50 additional curb drop inlets were added to prevent overtopping of the curbs west of that location. All other roadways can contain stormwater runoff between the curbs based on the planned drop inlets located at road sags.

Watershed Peak Runoff Rates

The TR-55 method was used to determine the time of concentration of each sub-watershed at full development. Then peak runoff rates were calculated based on the 100-year, 24-hour storm event of 3.23 inches. Santa Fe Land Development Code, Chapter 14, requires that the storm drain system be designed to handle at a minimum the peak runoff rate associated with the 100-year, 24-hour storm event, which for the TC3A area is 3.23 inches. But this engineer has experienced and others have reported short extreme downpours in the City of Santa Fe that produce 1 inch in 10 minutes. NOAA estimates that the 200-year, 10 minute storm is 1.08" whereas the 1000-year, 10 minute storm is 26% more, with a precipitation of 1.36" This engineer selected the 1000-year, 10 minute storm event of 1.36" to size all culverts so as to provide an adequate safety factor and ensure that at least the backbone infrastructure that the city will ultimately own and maintain can handle an extreme storm event. Furthermore, because these extreme downpours typically occur during a longer storm event that has already saturated the soil, it has been assumed that 100% of the 1.36" will runoff. For the benefit of the reviewer, the 100-year, 24-hour peak flow and the 1000-year, 10-minute peak flow of every subbasin is presented in Table 2. In most cases where the site is developed, the estimated peak flow for

TABLE 2 - WATERSHEDS POST DEVELOPMENT PEAK RUNOFF

WATERSHED ID	ACREAGE	CONDITION	HYDROLOGIC SOIL GROUP	CN	PONDING FACTOR	L1, LF	S1, %	L2, LF	S2, %	L3, LF	S3, %	TRAP DIMENSIONS	TC, HR	PEAK Q 100-YR, 24- HOUR, CFS	RUNOFF VOLUME 100YR, 24 HR STORM, CF	PEAK Q 1000-YR, 10 MIN, CFS. ASSUME 100% RUNOFF BY TC OR 10 MINUTES, WHICH EVER IS MORE
A1	40.02	UNDEVELOPED	C	73		300	0.028	1270	0.028				0.550	34.49	145,567	100
A2	3.04	ROADWAY		95		1430	0.033						0.107	18.29	29511	25
A3	0.79	DEVELOPED		90		50	0.015	250	0.015				0.164	3.3	6299	7
A4	6.75	UNDEVELOPED	C	73		300	0.019	850	0.019				0.614	5.41	24552	15
A5	17.63	DEVELOPED		90		50	0.015	880	0.048				0.205	66.01	140961	118
A6	11.91	UNDEVELOPED	A/B	58		300	0.037	1000	0.035				0.489	3.94	15210	33
A7	4.59	UNDEVELOPED/POND	A/B	58	0.72	70	0.071	550	0.025				0.156	2.27	5862	38
A8	0.63	UNDEVELOPED	A/B	58		250	0.100						0.231	0.37	805	4
B1	9.19	DEVELOPED		90		50	0.015	880	0.015				0.234	32.3	73271	54
B2	1.19	ROADWAY		95		710	0.012						0.1	7.32	11552	10
B3	11.74	DEVELOPED		90		50	0.015	790	0.032				0.197	44.61	93602	82
B4	9.19	DEVELOPED		90		50	0.015	800	0.034				0.195	35.32	73271	65
B5	3.72	ROADWAY		95		1640	0.022						0.147	19.9	36113	31
B6	1.48	ROADWAY		95		500	0.01						0.1	9.1	14367	12
B7	14.34	DEVELOPED		90		50	0.015	900	0.033				0.204	53.86	114332	96
B8	1.55	UNDEVELOPED/POND	A/B	58	0.72	50	0.1			350	0.050	3:1; 5'	0.1	1.25	1980	13
C1	5.58	DEVELOPED		90		50	0.015	700	0.037				0.186	22.06	44489	41
C2	1.27	ROADWAY		95		730	0.0313						0.1	7.81	12329	10
C3	7.21	DEVELOPED		90		50	0.015	950	0.046				0.196	27.71	57485	50
C4	1.71	ROADWAY		95		480	0.0429						0.1	10.52	16600	14
C5	7.01	DEVELOPED		90		50	0.015	1170	0.033				0.224	24.94	55890	43
C6	5.93	DEVELOPED		90		50	0.015	350	0.057				0.156	25.4	47279	49
C7	7.08	UNDEVELOPED/POND	B	58	0.73					1200	0.033	3:1; 5	0.1	4.18	9042	58
D1	3.31	DEVELOPED		90		50	0.015	450	0.044				0.165	13.81	26390	27
E1	6.6	60% DEV/40% UNDEV	B	77.2	0.73	50	0.015	300	0.040	550	0.064	3:1; 5	0.172	11.28	29841	53
E2	1.84	54% DEV/46% UNDEV	B	75.28		50	0.015	200	0.040	410	0.064	3:1; 5	0.161	3.99	7551	15
E3	1.62	40% DEV/60% UNDEV	B	70.8		50	0.015	200	0.040	140	0.236	3:1; 5	0.152	2.87	5210	13
F1	0.85	SCHOOL		90		150	0.04	250	0.100				0.255	2.86	6777	5
F2	1.88	SCHOOL		90		150	0.04	220	0.114				0.233	6.69	14989	11
F3	1.58	SCHOOL		90		280	0.071	100	0.150				0.294	4.68	12597	7
F4	3.52	SCHOOL/DEVELOPED		90		300	0.043	130	0.177	170	0.1	3:1; 5	0.383	8.12	28065	13
F5	0.25	DEVELOPED		90		50	0.015	80	0.040	20	0.5	3:1; 5	0.142	1.15	1993	2
F6	0.35	DEVELOPED		90		50	0.015	100	0.050	80	0.138	3:1; 5	0.146	1.54	2791	3
F7	0.89	90% DEV/10% UNDEV	B	86.8		50	0.015	210	0.050	50	0.36	3:1; 5	0.15	3.43	6220	7
F8	0.49	66% DEV/33% UNDEV	B	79		50	0.015	150	0.050	60	0.267	3:1; 5	0.147	1.35	2449	4

WATERSHED ID	ACREAGE	CONDITION	HYDROLOGIC SOIL GROUP	CN	PONDING FACTOR	L1, LF	S1, %	L2, LF	S2, %	L3, LF	S3, %	TRAP DIMENSIONS	TC, HR	PEAK Q	RUNOFF VOLUME	PEAK Q
														100-YR, 24- HOUR, CFS	100YR, 24 HR STORM, CF	1000-YR, 10 MIN, CFS. ASSUME 100% RUNOFF BY TC OR 10 MINUTES, WHICH EVER IS MORE
F9	0.22	25% DEV/75% UNDEV	B	66		50	0.015	50	0.050	150	0.2	3:1; 5	0.145	0.29	526	2
F10	1.66	25% DEV/75% UNDEV	B	66		50	0.015	100	0.050	200	0.23	3:1; 5	0.149	2.19	3966	14
F11	8.86	UNDEVELOPED	B	58		50	0.200	200	0.200				0.054	7.17	11315	73
G1	0.53	DEVELOPED		90		80	0.015						0.198	2.01	4226	4
G2	3.58	ROADWAY		95				850	0.045				0.1	22.02	34753	29
H1	1.13	DEVELOPED		90		50	0.015	400	0.017				0.177	4.59	9009	9
H2	1.77	ROADWAY		95				900	0.030				0.1	10.89	17183	15
H3	0.87	DEVELOPED		90		50	0.015	250	0.100				0.147	3.82	6936	7
H4	1.12	DEVELOPED		90		50	0.015	300	0.075				0.151	4.92	8930	9
H5	1.25	UNDEVELOPED	B	58						420	0.060		0.1	1.01	1596	10
I1	2.08	DEVELOPED		90		50	0.015	700	0.019				0.207	7.99	16584	14
I2	0.99	ROADWAY		95		600	0.019						0.1	6.09	9611	8
I3	2.28	DEVELOPED		90		50	0.015	350	0.086				0.152	9.87	18178	19
I4	0.43	DEVELOPED		90		50	0.015	300	0.083				0.15	1.87	3428	4
I5	0.65	UNDEVELOPED	B	73						350	0.086		0.1	0.53	830	5
J1	1.25	DEVELOPED		90		50	0.015	340	0.103				0.151	5.41	9966	10
K1	0.88	DEVELOPED		90		50	0.015	380	0.105				0.152	3.81	7016	7
K2	0.31	DEVELOPED		90		50	0.015	300	0.100				0.149	1.35	2472	3
K3	0.61	UNDEVELOPED	B	73		40	0.25			300	0.117		0.1	0.49	779	5
L1	1.52	DEVELOPED		90		50	0.015	270	0.111				0.147	6.68	12119	13
M1	1.05	DEVELOPED		90		50	0.015	220	0.136				0.144	4.68	8372	9
N1	3.74	UNDEVELOPED	B	73		300	0.0172	670	0.017				0.629	1.03	4776	8
N2	12.52	DEVELOPED		90		50	0.015	780	0.051				0.183	50.32	99821	94
N3	2.09	DEVELOPED		90		50	0.015	380	0.066				0.156	8.95	16663	17
N4	2.05	UNDEVELOPED	B	73						400	0.075		0.1	1.66	2618	17
O1	3.2	UNDEVELOPED	B	73		300	0.0192	350	0.019				0.561	0.97	4087	8
O2	1.57	DEVELOPED		90		50	0.015	600	0.058				0.17	6.48	12518	13
O3	1.72	DEVELOPED		90		50	0.015	550	0.045				0.172	7.02	13554	14
O4	1.46	UNDEVELOPED	B	73						580	0.052		0.1	1.18	1865	12
P1	1.09	DEVELOPED		90		50	0.015	400	0.063				0.158	4.67	8690	9

the 1000-year storm event is twice that of the 100-year storm event. Where the site is undeveloped, assuming the soils are saturated and 100% of the 10-minute storm runs off, the runoff rate increases 10-fold. Time of concentration and peak runoff rates for the developed condition calculations are provided in Appendix D.

Culvert Sizing

The culverts have been sized to accommodate the 1000-year, 10-minute storm runoff peak rates. Table 3 identifies each culvert, its contributing watersheds and total acreage, the peak runoff for the 100-year and 1000-year storm events, and the culvert inlet type (e.g. projecting or drop inlet), and the required head at the culvert inlet. Culvert locations are shown on Figure 5.

Summary

The backbone drainage infrastructure for TC3A has been designed to accommodate full build out of the project and to accommodate significant storm events up to 1.36" in 10 minutes. Eight common detention ponds will serve nearly all of the project at full buildout. The exception lies within a portion of Tract 60, in which there was no appropriate place to install the required 0.22 AF detention pond that would not greatly impact the development of that tract. Therefore, that tract developer will need to install either on-lot ponding or common ponds to reduce runoff to the historic flow rate (1.42 CFS) from that watershed. The eight common detention ponds have been sized to release calculated historic flow rates of a 100-year, 24-hour storm event. Pond outlets have been designed to release greater flows during larger storm events to control the release location and prevent overtopping. All ponds, except for the B ponds, release to open space or in the case of pond A1, directly to the Arroyo de los Chamisos. The B ponds discharge to an existing neighborhood. Much of that watershed has been redirected to Watershed A to reduce flows passing through the B ponds.

Runoff from developed tracts may exceed pre-development discharge rates, but adequate measures must be provided by tract developers to prevent the excess runoff from causing damage on its way to the detention ponds.

TABLE 3 - CULVERT PEAK FLOW AND SIZE

CULVERT ID	CONTRIBUTING WATERSHEDS	CONTRIBUTING WATERSHEDS ACREAGE	PEAK Q 100-YR, 24-HOUR STORM EVENT, CFS	PEAK Q 1000-YR, 10-MIN STORM EVENT, CFS	CULVERT INLET	CULVERT SIZE, INCHES	MIN HEAD AT CULVERT INVERT, FT
A1	A1	40.02	35	100	PROJECTING	2-36	4.5
A2	1/2 A2	1.52	9.15	12.5	DI	18	3.5
A3	A2	3.04	18.29	25	DI	24	4
A4	A3	0.79	3.3	7	PROJECTING	18	2.5
A5	A3+A4	7.54	8.71	22	MDI	24	3.2
B1	B1	9.19	32.3	54	MDI	36	4.5
B2	B1	9.19	32.3	54	MDI	36	4.5
B3	B1+1/2B2	9.79	35.96	59	DI	36	5
B4	B1+B2	10.38	39.62	64	DI	36	6
B5	B1+B2+1/4B4	12.68	48.45	80.25	MDI	48	4.32
B6	B1+B2+1/3B4	13.44	51.39	85.66	MDI	48	4.52
B7	1/2B5	1.86	10	15.5	DI	24	2.3
B8	B5	3.72	19.9	31	DI	24	5.1
B9,B10,B11	B1+B2+B3+1/3B4+B5	28.90	115.79	198.65	MDI	72	1.02
B13	2/3B4	6.13	23.54	43.33	MDI	36	3.63
C1	C1	5.58	22.06	41	MDI	24	4.2
C2	C1+1/2C2	6.22	25.97	46	DI	36	3.84
C3	C1+C2	6.85	29.87	51	DI	36	4.14
C4	C1+C2+C3	14.06	57.58	101	MDI	48	6
C5	1/2C4	0.43	5.13	7	DI	24	1.4
C6	C4	1.71	10.25	14	DI	24	2.2
G1	G1+1/4G2	1.425	7.52	11.25	DI	18	2.5
G2	G1+1/2G2	2.32	13.02	18.5	DI	18	5.7
G3	1/4G2	0.895	5.51	7.25	DI	18	2.5
G4	1/4G2	0.895	5.51	7.25	DI	18	2.5
H1	H1	1.13	4.59	9	MDI	18	2.5
H2	H1+1/2H2	2.015	10.04	16.5	DI	24	2.7
H3	H1+H2	2.9	15.48	24	DI	24	3.7
H4	H1+H2+H3+H4+H5	6.14	25.23	50	PROJECTING	36	4.5
I1	I1	2.08	7.99	14	MDI	24	2.7
I2	I1+1/2I2	2.575	11.04	18	DI	24	2.7
I3	I1+I2	3.07	14.08	22	DI	24	3.7
I4	I1+I2+I3+I4+I5	6.43	26.35	50	MDI	36	4.5
J1	J1	1.25	5.41	10	PROJECTING	18	2.63
K1	K1+K2+K3	1.8	5.65	15	PROJECTING	24	2.7
L1	L1	1.52	6.68	12	PROJECTING	18	3.3
M1	M1	1.05	4.68	8	PROJECTING	18	2.5
N1	N1+N2+N3+N4	20.4	61.96	136	PROJECTING	2-48	5
O1	O1+O2+O3+O4	9.04	15.65	47	PROJECTING	36	4.5